Date: 11.05.2020 - 15.05.2020

Subject: Science Form 1

Chapter 3: Coordination and Response

Topic: 3.1 Homeostasis in living things
3.2 Regulation of body temperature
3.3 Effect of vigorous activity on the rate of heartbeat

Instructions:

1. Let's view this video clip.
   Homeostasis in Humans and Animals:
   https://www.youtube.com/watch?v=XDEp70uJOWQ&list=PLPEh61e-2oYfx3cxUUlwXNtU6CRAf-Tf-&index=11&t=0s

2. **Do exercises in Science workbook page 57 - 62.** You can refer to the answer in Science textbook page 72 - 77.

3. After finishing your exercises, do self-assessment by checking your answers. Answers are on the **next page**.

Thank you. Enjoy your learning.

Answers:

Aktiviti perbincangan *Discussion activity* **3.1**

Homeostasis dalam benda hidup
Homeostasis in living things

PBD TP 1 & 4

Buku Teks m.s. 72 – 76

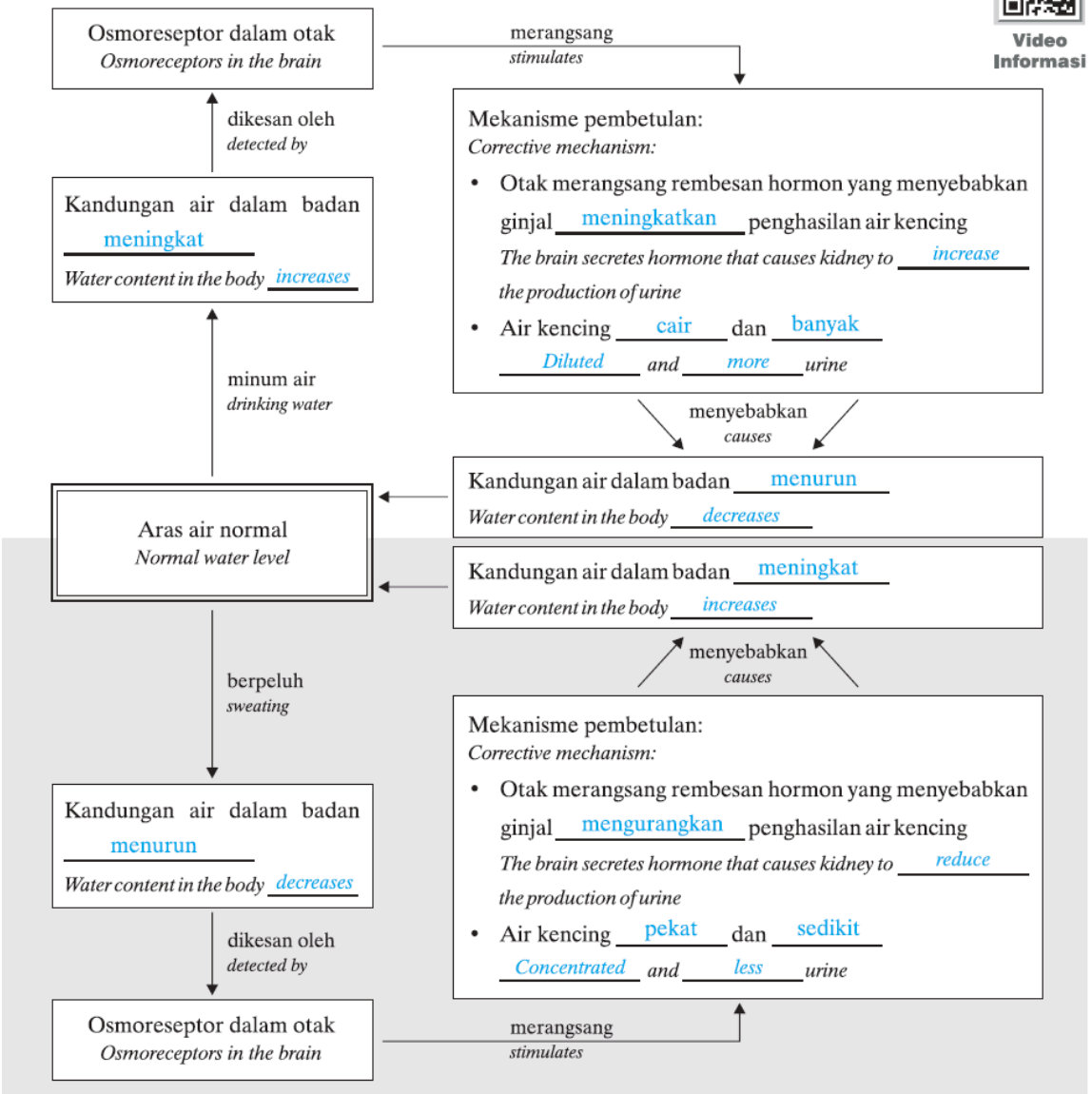
1 Takrifkan homeostasis. TP 1
Define homeostasis.

Pengekalan keadaan persekitaran dalam badan seperti aras suhu, kandungan air, pH dan tekanan darah supaya berada dalam keadaan seimbang dan stabil.
Maintenance of internal environment of the body such as temperature level, water content, pH and blood pressure to be in balanced and stable condition.

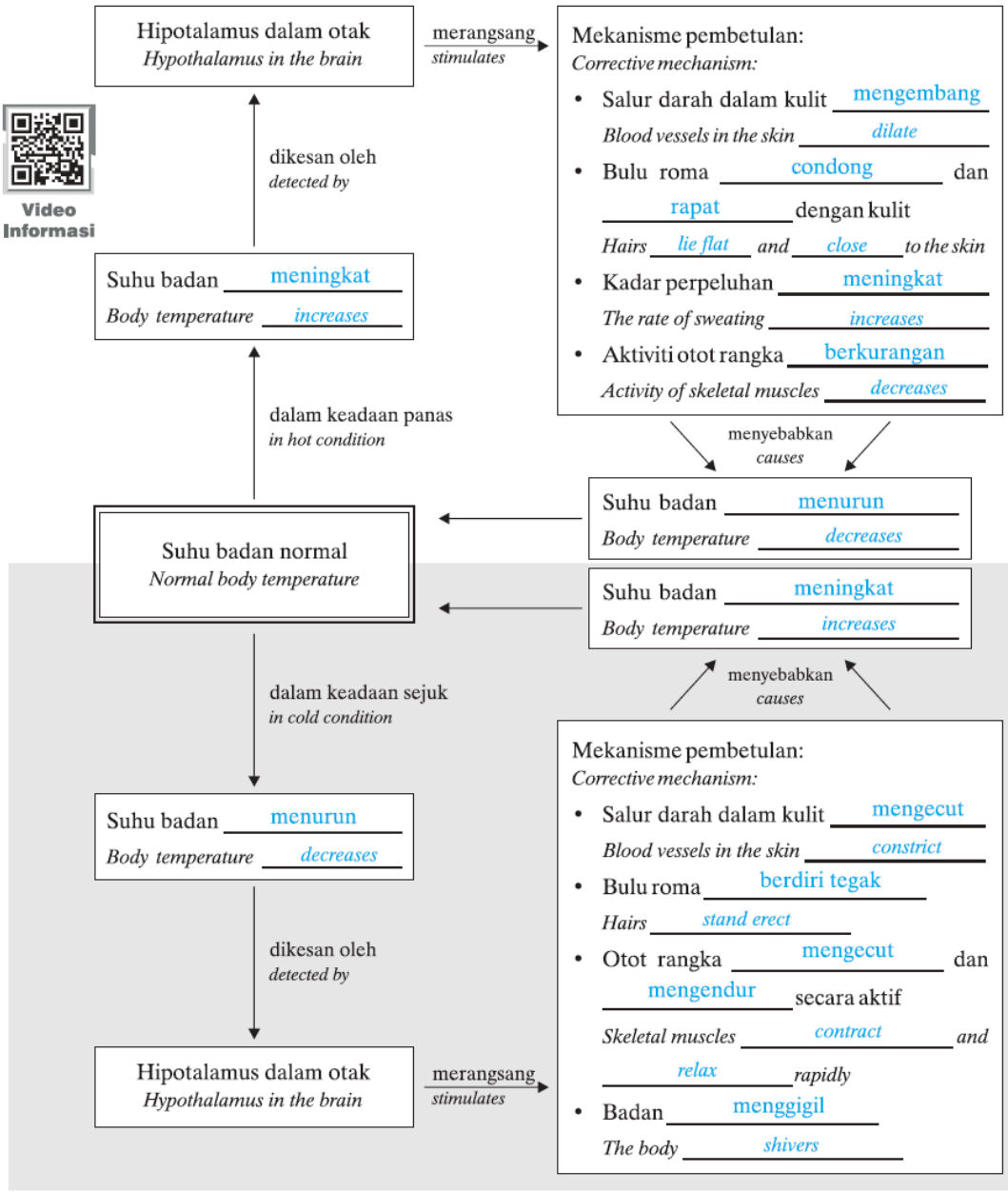
2 Apakah bendalir yang mengelilingi sel-sel badan dalam persekitaran dalaman? TP 1
What is the fluid that surrounds the cells in the internal environment?
Bendalir luar sel / *Interstitial fluid*

3 Lengkapkan rajah di bawah berkaitan dengan pengawalaturan air dalam badan manusia. TP 4
Complete the diagram below regarding water regulation in the human body.

Video Informasi



4 Lengkapkan rajah di bawah berkaitan dengan pengawalaturan suhu badan manusia. TP 4
Complete the diagram below regarding regulation of human body temperature.



Science for Living

Bagaimanakah angkasawan mengekalkan pengawalaturan air di angkasa?
Membuang air kecil merupakan salah satu kaedah untuk mengekalkan homeostasis. Untuk membuang air kecil, angkasawan menggunakan tiub yang panjang yang berakhir dengan corong (bagi lelaki) atau cawan (bagi wanita). Sistem vakum menyedut sisa tersebut. Sesetengah sistem melepaskan air kencing ke angkasa tetapi tandas moden di angkasa direka untuk mengitar semula air kencing menjadi air minuman. Baca maklumat lanjut di:
science.howstuffworks.com/bathroom-in-space.htm

How do astronaut maintains their water regulation in space?
Urinating is one of the method to maintain homeostasis. For urinating, astronauts use a long tube ending with a funnel (for males) or a cup (for females). A vacuum system sucks the waste away. Some systems vent the urine into space but modern space toilets are designed to recycle urine into drinking water. Read more information at:
science.howstuffworks.com/bathroom-in-space.htm

Informasi

Pendekatan Inkuiri

Eksperimen *Experiment* **3.2**

Pengawalaturan suhu badan
Regulation of body temperature

PBD TP 1 & 3

Buku Teks m.s. 76 – 77

Tujuan *Aim*

Mengkaji tindakan biologi badan yang memberikan gerak balas kepada perubahan suhu.
To study the biological action of body that responds to the change in temperature.

Pernyataan masalah *Problem statement*

Adakah perubahan suhu persekitaran memberi kesan terhadap gerak balas tindakan biologi badan?
Does the change in surrounding temperature gives effects towards the response of biological action of the body?

Hipotesis *Hypothesis*

Badan berpeluh apabila suhu persekitaran meningkat dan menggigil apabila suhu persekitaran menurun.

The body sweats when surrounding temperature increases and shivers when the surrounding temperature decreases.

Pemboleh ubah *Variables*

(a) Dimanipulasikan : Suhu persekitaran
Manipulated : *Surrounding temperature*

(b) Bergerak balas : Perubahan keadaan badan
Responding : *The changes in body condition*

(c) Dimalarkan : Murid yang menjalankan aktiviti
Constant : *The student who carrying out the experiment*

Radas *Apparatus*

Jam randik.
Stopwatch.

Prosedur *Procedure*

1 Pilih seorang murid dan biarkan dia berada di dalam sebuah bilik tanpa kipas atau penghawa dingin.
Pick one student and leave him/her in a room without fan or air conditioner.

2 Biarkan murid berada di dalam bilik tersebut selama 15 minit.
Let the student to stay in the room for 15 minutes.

3 Perhatikan perubahan yang berlaku dan catatkan pemerhatian anda.
Observe the changes that occur and record your observation.

4 Ulang langkah 1 hingga 3 dengan memilih murid yang sama tetapi dibiarkan di dalam bilik berhawa dingin dengan suhu 16°C.
Repeat steps 1 to 3 by choosing the same student but left in the air-conditioned room with a temperature of 16°C.

Pemerhatian *Observation*

Suhu persekitaran *Surrounding temperature*	**Pemerhatian** *Observation*
Panas *Hot*	Berpeluh *Sweats*
Sejuk *Cold*	Menggigil *Shivers*

Perbincangan *Discussion*

1 Berdasarkan eksperimen, apakah faktor yang dikawal atur untuk membolehkan sel badan berfungsi secara optimum? TP 1
Based on the experiment, what is the factor that is regulated to allow body cells to function optimally?
Suhu / *Temperature*

Knowledge Beyond the Classroom

2 Tandakan (√) pada mekanisme pembetulan yang berlaku pada murid yang ditinggalkan dalam bilik sejuk.
Mark (√) on the corrective mechanism that occurs on the student left in the cold room. TP 3

√	Otot rangka mengecut dan mengendur secara aktif *Skeletal muscles contract and relax rapidly*
	Otot rangka mengembang secara aktif *Skeletal muscles expand rapidly*
√	Bulu roma berdiri tegak *Hairs stand erect*

3 Tandakan (√) pada mekanisme pembetulan yang berlaku pada murid yang ditinggalkan dalam bilik panas. TP 3
Mark (√) on the corrective mechanism that occurs on the student left in the hot room.

	Otot rangka mengecut dan mengendur secara aktif *Skeletal muscles contract and relax rapidly*
√	Salur darah dalam kulit mengembang *Blood vessels in the skin dilate*
√	Bulu roma condong dan rapat dengan kulit *Hairs lie flat and close to the skin*

Kesimpulan
Conclusion

1 Badan berpeluh apabila suhu persekitaran meningkat dan menggigil apabila suhu persekitaran menurun.
The body sweats when the surrounding temperature increases and shivers when the surrounding temperature decreases.

2 Hipotesis diterima.
The hypothesis is accepted.

Tahap Penguasaan Penyiasatan Saintifik					
1	2	3	4	5	6

Tahap Penguasaan Sikap Saintifik dan Nilai Murni					
1	2	3	4	5	6

Latihan Pengukuhan KBAT

Seorang wanita California berusia 28 tahun ditemui mati dalam suatu pertandingan selepas meminum enam liter air dalam tempoh tiga jam tanpa pergi ke bilik air. Apakah yang terjadi kepada wanita tersebut? Adakah anda fikir badannya tidak mengekalkan homeostasis? Jelaskan. TIMSS PISA
A 28-years-old California woman was found dead in a contest after drinking six liters of water in three hours without taking a trip to the bathroom. What happened to that woman? Do you think her body is not maintaining homeostasis? Explain.

Ginjal manusia hanya boleh menyingkirkan kira-kira ***setengah liter air dalam tempoh satu jam***. Meminum terlalu banyak air menyebabkan ketidakseimbangan, di mana cecair bergerak dari darah ke dalam sel dan menjadikan ***sel mengembang***. Ini mewujudkan ***tekanan di dalam otak*** dan menyebabkan ***kematian***. Memandangkan wanita tersebut meminum air dalam kuantiti yang ***lebih daripada yang boleh disingkirkan oleh ginjal***, badannya tidak dapat mengawalatur kandungan air dengan baik.

*Human's kidney can only expel about **half liter water in an hour**. Drinking too much water causes an imbalance, where the liquid moves from blood into the cells and making them **swell**. This creates **pressure inside the brain** and causes **death**. Since she drinks water in a quantity **greater than what can be eliminated by the kidneys**, her body is unable to regulate water content very well.*

Pendekatan Inkuiri

Eksperimen *Experiment* **3.3**

Kesan aktiviti cergas (tugas berat) terhadap kadar degupan jantung
Effect of vigorous activity (heavy task) on the rate of heartbeat

PBD TP 1, 2, 4 & 5

Buku Teks m.s. 76 – 77

Tujuan *Aim*

Mengkaji kesan aktiviti cergas terhadap kadar degupan jantung.
To study the effect of vigorous activity on the rate of heartbeat.

Pernyataan masalah *Problem statement*

Adakah kadar degupan jantung meningkat apabila melakukan aktiviti cergas?
Does the rate of heartbeat increase when carrying out vigorous activity?

Hipotesis *Hypothesis*

Kadar degupan jantung meningkat apabila melakukan aktiviti cergas.
The rate of heartbeat increases when carrying out vigorous activity.

Pemboleh ubah *Variables*

(a) Dimanipulasikan : Jenis aktiviti cergas
Manipulated : *Type of vigorous activity*

(b) Bergerak balas : Kadar degupan jantung
Responding : *The rate of heartbeat*

(c) Dimalarkan : Tempoh masa aktiviti
Constant : *Duration of activity*

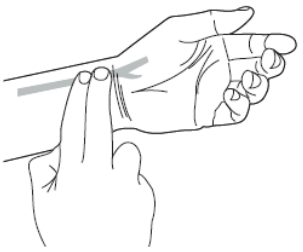
Radas *Apparatus*

Jam randik dan tali skip.
Stopwatch and skipping rope.

Prosedur *Procedure*

1 Jalankan aktiviti ini secara berpasangan.
Carry out the activity in pairs.

2 Ukur kadar degupan jantung rakan anda semasa rehat dengan meletakkan dua jari pada pergelangan tangan yang bertentangan seperti yang ditunjukkan dalam rajah. Kira bilangan degupan jantung selama 15 saat, kemudian darabkan dengan 4 untuk mendapatkan bilangan degupan jantung untuk 1 minit.
Measure the rate of heartbeat of your friend when resting by placing two fingers on the opposite wrist as shown in the diagram. Count the number of heartbeats in 15 seconds, then multiply by 4 to obtain the number of heartbeats for 1 minute.



3 Suruh rakan anda untuk berjoging selama satu minit dan ukur kadar degupan jantungnya dengan jam randik selepas melakukan aktiviti.
Ask your friend to jog for one minute and measure his rate of heartbeat using stopwatch after conducting the activity.

4 Suruh rakan anda untuk berehat selama beberapa minit sehingga kadar degupan jantung kembali normal.
Ask your friend to rest for a few minutes until the rate of heartbeat go back to normal.

5 Ulang langkah 3 dan 4 dengan melakukan aktiviti lain seperti yang dinyatakan dalam jadual.
Repeat steps 3 and 4 by doing other activities as stated in the table.

Keputusan *Results*

Aktiviti *Activity*	**Kadar degupan jantung (denyutan / min)** *Rate of heartbeat (beats / min)*
Berehat *Resting*	
Joging *Jogging*	
Lompat tali *Rope jumping*	
Berjalan *Walking*	

(Jawapan murid / *Student's answer*)

Perbincangan
Discussion

1 (a) Aktiviti yang manakah dianggap paling cergas? TP 1
Which activity is considered the most vigorous?
Lompat tali / *Rope jumping*

(b) Aktiviti yang manakah dianggap paling kurang cergas? TP 1
Which activity is considered the least vigorous?
Berehat / *Resting*

(c) Berikan sebab kepada jawapan anda. TP 2
Give reasons for your answer.
Kerana aktiviti lompat tali menghasilkan kadar degupan jantung yang paling tinggi berbanding aktiviti yang lain. Berehat pula menghasilkan kadar degupan jantung yang paling rendah berbanding aktiviti lain.
Because rope jumping activity produces the highest rate of heartbeat compared to other activities. Resting produces lowest rate of heartbeat compared to other activities.

2 Apakah kesan melakukan aktiviti cergas kepada kadar degupan jantung? TP 2
What is the effect of doing vigorous activity on the rate of heartbeat?
Kadar degupan jantung meningkat. / *The rate of heartbeat increases.*

Knowledge Beyond the Classroom

3 Apakah yang akan berlaku kepada kadar degupan jantung sekiranya masa untuk melakukan aktiviti cergas dipanjangkan kepada 5 minit? Jelaskan. TP 4 KBAT
What will happen to the rate of heartbeat if the time taken to carry out vigorous activity is extended to 5 minutes? Explain.
Kadar degupan jantung akan meningkat. Semasa aktiviti cergas, jantung akan mengepam darah lebih kerap ke bahagian badan yang memerlukan oksigen. Permintaan sel terhadap oksigen meningkat kerana sel-sel perlu menjalani respirasi supaya tenaga boleh dihasilkan.
The rate of heartbeats will increase. During vigorous activity, the heart pumps blood more frequently to the body parts that require oxygen. The cell's demand towards oxygen increases as cells need to undergo respiration so that energy can be produced.

4 Nyatakan perubahan fisiologi lain yang boleh diperhatikan apabila melakukan aktiviti cergas.
State other physiological changes that can be observed when carrying out vigorous activity. TP 5
Badan akan menghasilkan peluh. / *The body will produce sweat.*

Kesimpulan
Conclusion

1 Kadar degupan jantung meningkat apabila melakukan aktiviti cergas.
The rate of heartbeats increase when carrying out vigorous activity.

2 Hipotesis diterima.
The hypothesis is accepted.

Tahap Penguasaan Penyiasatan Saintifik					
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