Body systems: make a concept map and measure your reaction time

Name: Class: Date:

Page 1 has concepts and linking words to cut out and arrange into your own concept map. Page 2 is a practical to measure your reaction time with a ruler.

CONCEPT MAP Make your own concept map

Focus question: How does the body keep conditions steady?

1. Cut out the concept cards and the linking-word cards.
2. Read the focus question. Put the most general concepts, such as Negative feedback, near the top, and the more specific ones further down.
3. Join two concepts with an arrow, and lay linking words along it so that the two concepts and the words read as a sentence.
4. Put any concept you aren't sure about to one side, in a parking lot, and come back to it later (Novak and Cañas).
5. Add cross-links: arrows that join concepts in different parts of the map, such as Hypothalamus and Hormones.
6. Swap with a partner and read each other's maps aloud as sentences. Change any link that doesn't make a true sentence. Stick your map down or copy it.

Concepts

Negative feedback	**Stimulus**	**Receptors**	**Command centre**
Effectors	**Response**	**Nervous system**	**Endocrine system**
Electrical impulses	**Hormones**	**Blood**	**Hypothalamus**
Body temperature	**Sweat glands**	**Pancreas**	**Insulin**
Glucagon	**Blood glucose**		

Linking words

is detected by	*send messages to*	*carry out*	*can send messages through*
carries messages as	*travel in*	*is the command centre for*	*releases*
lowers	*raises*	*make sweat, which lowers*	*reverses a change in*
detects	Write your own:	Write your own:	Write your own:

1. Write three sentences, called propositions, that you can read from your map.

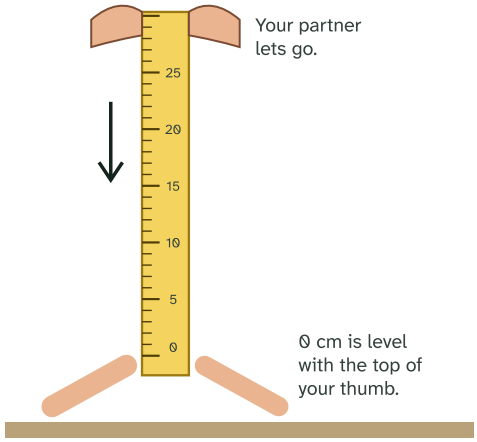
2. Which cross-link did you add? Why does it belong in the map?

3. Where would you add type 1 diabetes or hypothermia to your map?

PRACTICAL Measure your reaction time

Each pair needs: a 30 cm ruler, a table and a chair.

> **Safety.** Use a plastic or wooden ruler with no sharp edges, and drop it only from the height in step 2.



1. Sit with your forearm on the table and your hand over the edge. Hold your thumb and first finger about 2 cm apart.
2. Your partner holds the ruler upright between your thumb and finger, with the 0 cm mark level with the top of your thumb.
3. Your partner lets go of the ruler without warning. Catch it between your thumb and finger as quickly as you can.
4. Read the distance at the top of your thumb. That is how far the ruler fell before you caught it.
5. Don't count a catch under 5 cm, which is under 0.10 s. In sprint races a reaction time of less than 0.1 seconds counts as a false start (World Athletics). Do that try again.
6. Do 5 tries each, then use the table at the bottom to turn each distance into a reaction time.

Try	1	2	3	4	5	Average
Distance (cm)						
Reaction time (s)						

Turn the distance into a time: $t = \sqrt{(2 \times d \div 9.8)}$, with d in metres (OpenStax)

Distance (cm)	6	8	10	12	14	16	18	20	22	24	26	28	30
Time (s)	0.11	0.13	0.14	0.16	0.17	0.18	0.19	0.20	0.21	0.22	0.23	0.24	0.25

1. Catching the ruler isn't a reflex. Which parts of your nervous system carry the message from your eyes to your fingers?

2. Why is it better to do 5 tries and average them than to do one try?

3. Your partner always lets go after counting to three. Why would that make your results less useful?