

Name: _____ Country: _____

Practical 01

Find the flow rate of the channel section.

For this activity, you would need to collaborate with the other student to measure the speed of the water flow.

One of you will enter the water in point 1, and go to the middle of the canal. There, he/she will release a floating object.

The other student will go downstream at point 2 and, using a stopwatch, note the time taken for the floating object to move from point 1 to point 2.

Repeat this twice more and calculate the average value.

Calculate the speed of water (s) using the following parameters:

s = speed of water (meter/second)

d = distance covered (meters)

t = time (seconds)

Write the formula below:	(5 points)
s =	
Data collected:	
t ₁ = , t ₂ = , t ₃ =	
Average time =	(2 points)
The speed of water according to your calculation =	

Multiply this average value by 0.85, because the average speed of water is about 85 % of the surface speed.

The width of the canal is 6 m.

The average water depth value is 1 m.

Assuming that the section is rectangular, calculate the theoretical area (A). (2 points)

A =

Using this result, calculate the flow across the section.

Write the formula below: (2 points)

Flow rate (m³/s) =

Estimated (calculate) flow rate (m³/s) assuming a rectangular cross section =

Question: The real flow rate is (a) (b) (c) the estimated (calculated) flow rate. (2 points)
Tick the correct answer above.

- a) greater than
- b) less than
- c) the same as

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Practical 02

Material: Psychrometer

1) Measure the air (dry and wet) temperatures in two places: under the sun and in the shadow. Try to choose places with the same land-use type.

A) temperature in sunny place dry: _____ wet: _____

B) temperature in shaded place dry: _____ wet: _____

2) Where should the relative humidity be higher? (5 points)

- (a) In the sunny place
- (b) In the shaded place
- (c) Similar in both places.

3) Using the given table, what is the relative humidity (percentage) in both sites?

A) relative humidity in the sunny place: _____ (%) (2 points)

B) relative humidity in the shaded place: _____ (%) (2 points)

Table to estimate relative humidity (%) using the wet bulb temperature (axis Y) and the difference between the dry and wet bulb temperatures (axis X).

Dry bulb temperature minus wet bulb temperature

	0.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
40	100	97	94	91	88	85	83	80	78	75	73	71	68	66	64	62	60	58	57
39	100	97	94	91	88	85	82	80	77	75	72	70	68	66	64	61	60	58	56
38	100	97	94	91	88	85	82	79	77	74	72	70	67	65	63	61	59	57	56
37	100	97	93	90	87	85	82	79	77	74	72	69	67	65	63	61	59	57	55
36	100	97	93	90	87	84	82	79	76	74	71	69	67	64	62	60	58	56	54
35	100	97	93	90	87	84	81	78	76	73	71	68	66	64	62	60	58	56	54
34	100	97	93	90	87	84	81	78	75	73	70	68	66	63	61	59	57	55	53
33	100	96	93	90	87	84	81	78	75	72	70	67	65	63	61	58	56	54	52
32	100	96	93	90	86	83	80	77	75	72	69	67	65	62	60	58	56	54	52
31	100	96	93	89	86	83	80	77	74	71	69	66	64	62	59	57	55	53	51
30	100	96	93	89	86	83	80	77	74	71	68	66	63	61	59	56	54	52	50
29	100	96	93	89	85	82	79	76	73	70	68	65	63	60	58	56	54	51	49
28	100	96	92	89	85	82	79	76	73	70	67	65	62	60	57	55	53	51	48
27	100	96	92	89	85	82	78	75	72	69	67	64	61	59	56	54	52	50	47
26	100	96	92	88	85	81	78	74	71	68	66	63	60	58	55	53	51	49	46
25	100	96	92	88	84	81	77	74	71	67	65	62	59	57	54	52	50	47	45
24	100	96	92	88	84	80	77	74	70	67	64	61	59	55	53	51	49	47	44
23	100	96	91	87	84	80	76	73	69	67	63	61	58	55	53	50	48	46	43
22	100	96	91	87	83	80	76	72	69	66	63	60	57	55	52	49	47	45	42
21	100	96	91	87	83	79	75	72	68	65	62	59	56	54	51	49	46	43	41
20	100	95	91	87	82	78	74	71	67	64	61	58	55	53	49	47	44	43	40
19	100	95	91	86	82	78	74	70	66	63	60	57	54	51	48	46	43	41	39
18	100	95	90	86	81	77	74	70	66	63	59	56	53	50	47	45	42	40	37
17	100	95	90	85	81	77	72	69	65	62	58	55	52	49	46	43	40	39	36
16	100	95	90	85	80	76	72	68	64	60	57	54	50	48	44	42	39	36	34
15	100	95	89	84	80	75	71	67	63	59	55	52	49	46	43	41	38	35	33
14	100	94	89	84	79	74	70	66	62	58	54	51	47	45	41	39	36	34	31
13	100	94	89	84	78	74	69	65	61	57	53	50	46	43	40	37	34	32	29
12	100	94	89	83	78	73	68	63	59	56	52	48	44	42	38	35	32	30	27
11	100	94	89	83	77	72	67	62	58	54	50	47	43	40	36	33	30	28	25
10	100	94	87	82	76	71	66	61	57	53	49	45	41	38	34	31	28	26	23
9	100	94	87	81	75	70	65	60	55	51	47	43	39	36	32	29	26	23	20
8	100	93	87	80	74	69	63	58	54	49	45	41	37	34	30	27	24	21	18
7	100	93	86	79	73	67	62	57	52	47	43	39	35	31	28	25	21	18	15
6	100	93	85	79	72	66	61	55	50	45	41	36	33	28	25	22	18	16	13
5	100	93	85	78	71	65	59	54	48	43	39	34	30	26	22	18	16	12	10
4	100	92	84	77	70	64	57	52	47	41	36	32	28	23	19	15	13		
3	100	92	83	76	69	62	55	49	44	38	33	29	24	20	16				
2	100	91	82	74	67	60	53	47	41	35	30	25	21	17					
1	100	91	82	73	65	58	51	45	38	33	27	22	17						

Wet bulb temperature (°C)

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Practical 3

Plate Tectonics Theory: The Dance of the Continents

Instruction:

Please return the maps and the answer sheet.

You are provided with a set of five paleogeographic maps of Australia and a map.

You are going to establish the path of movement of Australia during a certain geological period by drawing its position on the map (provided to you) at different times. For this, you will:

- Draw, for each age, the position of Australia on the map provided using the outline of Australia. Assume, for simplicity, that the longitude of the centre of Australia is the same all through the geological period. (5 points)
- Write the age for each position.
- Draw arrows to indicate the path of movement of Australia. (4 points)

Choose the sentence which best describes the movement of Australia during the whole period.
(Correct answer = 1 point)

- a) Australia did not move during the geological period.
- b) Australia moved southward, then northward during the geological period without rotating.
- c) Australia moved northward, then southward during the geological period without rotating.
- d) Australia moved northward, then southward during the geological period and rotated mostly clockwise.
- e) Australia moved northward, then southward during the geological period and rotated mostly counter-clockwise.
- f) Australia moved southward, then northward during the geological period and rotated mostly clock-wise.
- g) Australia moved southward, then northward during the geological period and rotated mostly counter-clockwise.

For the three periods indicated in the table below, what could have been the climate in the **center** of Australia? (1 point x 3 = 3 points)

Early Cretaceous (120 Ma)	(a) Temperate (b) Polar (c) Arid (d) Semi-arid (e) Equatorial
Late Devonian (365 Ma)	(a) Temperate (b) Polar (c) Arid (d) Semi-arid (e) Equatorial
Early-Mid Devonian (400 to 380 Ma)	(a) Temperate (b) Polar (c) Arid (d) Semi-arid (e) Equatorial

Name: _____ Country: _____

Duration: 45 minutes

Practical 04

Geo Field evaluation

Field kit: hammer, hydrochloric acid, knife

Note: THE ROCKS AT STOPS 1 AND 2 MAY CONTAIN ONE OR MORE MINERALS.

Stop 1

1. Using the kit, identify the rock here (Circle the correct answer from the options given below). (5 points)

- | | |
|---------------------|--------------|
| a. Limestone | i. Asphalt |
| b. Marl | j. Basalt |
| c. Mica schist | k. Chert |
| d. Porphyritic rock | l. Shale |
| e. Obsidian | m. Dolomite |
| f. Sandstone | n. Gabbro |
| g. Schist | o. Gneiss |
| h. Rhyolite | p. Granite |
| | q. Quartzite |

2. Based on its characteristics, what can you conclude about the rock? (5 points)

- It is a sedimentary rock.
- It is a plutonic rock.
- It is a volcanic rock
- It is a metamorphic rock.

Stop 2

3. Using the kit, identify the rock here. (Circle the correct answer from the options given below). (5 points)

- a. Limestone
- b. Marl
- c. Mica schist
- d. Porphyritic rock
- e. Obsidian
- f. Sandstone
- g. Schist
- h. Rhyolite
- i. Asphalt
- j. Gabbro
- k. Gneiss
- l. Granite
- m. Quartzite
- n. Shale
- o. Dolomite
- p. Chert
- q. Basalt

4. Which mineral/s listed below is/are most likely the constituent/s of this rock at Stop 2? (5 points)

- a. Calcite
- b. Magnetite
- c. Quartz
- d. Clay
- e. Garnet
- f. Orthoclase
- g. Olivine
- h. Halite

5. What is the age relationship between the rock at Stop 1 and the rock at Stop 2?

(10 points)

- a) The rock at Stop 1 is younger.
- b) The rock at Stop 1 is older.
- c) Both rocks are of the same age.

6. Which of the processes of the rock cycle listed below is demonstrated by the rocks at Stops 1 and 2?

Mark **ALL** the possible processes.

Note: **Each** correct answer = 1 point; **Each** wrong answer = -1 point

- a. melting
- b. slow cooling
- c. eruption
- d. intrusion
- e. fast cooling
- f. slow cooling followed by fast cooling
- g. uplift
- h. erosion
- i. transportation
- j. sedimentation
- k. lithification
- l. burial
- m. regional metamorphism
- n. contact metamorphism

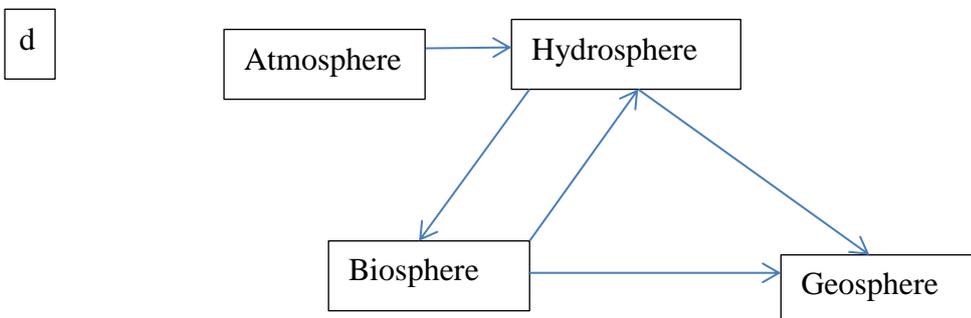
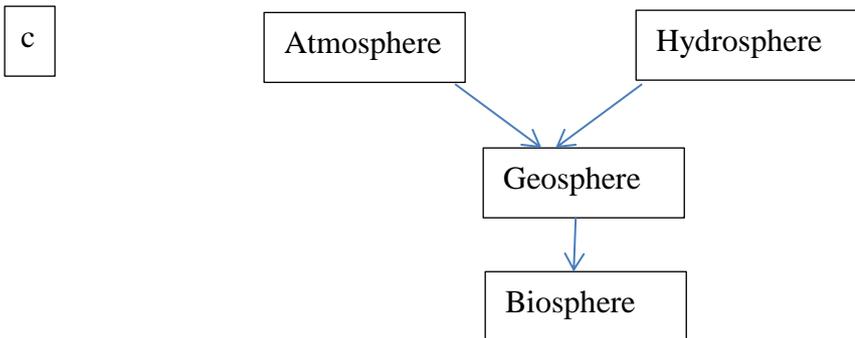
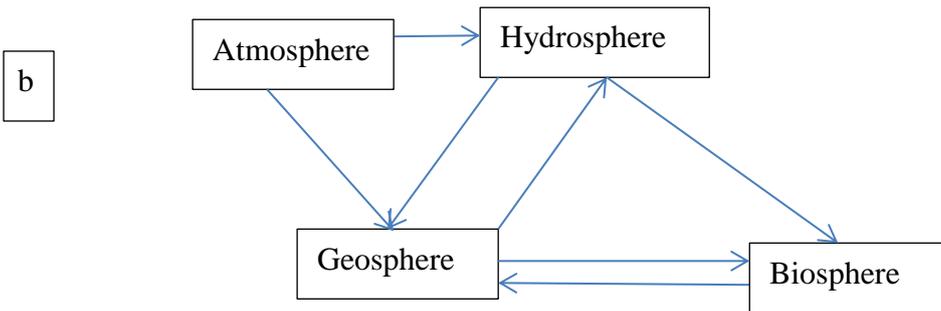
7. Chronologically arrange **ONLY** those processes that you marked above from the oldest to the youngest. Write the English letter corresponding to the process above the arrow.

(Note: some process/es could appear twice.)

(1 point for each correctly arranged process)



8. Answer the following question based on what you have explored **here** and what you have seen. Which of the schemes listed below best summarizes the interactions of the earth systems? (10 points)



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Practical 06

Astronomy

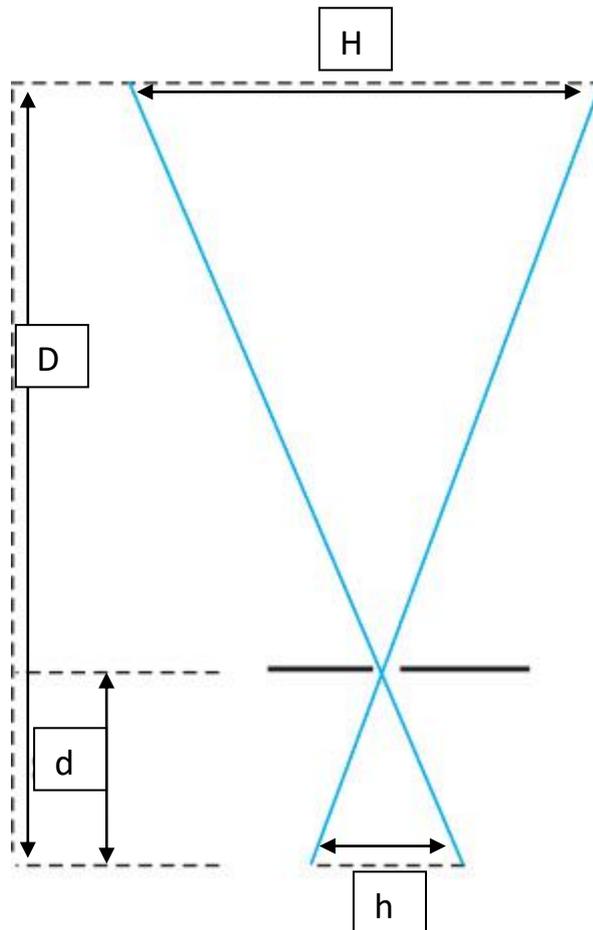
Measure the Earth rotation speed

In front of you there is a table with a hole. The sun light passes through the hole and hits a sheet of paper on the ground. After some time the sun light spot will move a certain distant “h”.

“H” gives the apparent movement of the sun in the sky.

“d” stands for the table height.

“D” stands for distance between Earth and Sun, which is $1,5 \times 10^{11}$ m. As you may notice the distance between Earth and Sun is much larger than the table height so you could approximate the situation to the following diagram)



On the given sheet are marked the two positions of the sun light spots with a 10 minute interval. Measure this distance “h”. (1 point)

Calculate “H” from the given data (show the procedures). (2 points)

Calculate the apparent linear speed of the sun in km/s (show the procedures). (2 points)

Calculate, using your data, the angular speed of Earth rotation (degrees/min) (show the procedures). (2 points)