LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

PRACTICAL INVESTIGATION

NATURAL SCIENCES | GRADE 9 | TERM 1

DURATION: 1 Hour

Details of the Learner			
Class:		Date:	**20 February 2026**
Learner's Name			

Office Use Only			
	Maximum Marks	**Mark Obtained**	**Moderated Mark**
1. Addendum A	08		
2. Addendum B	04		
3. Practical Report	28		
TOTAL	**40**		
Educator's Signature		Date:	
DH Signature		Date:	

INSTRUCTIONS

1. Answer ALL questions in the spaces provided.
2. Read all the instructions before answering the questions.
3. Write neatly and legibly.

This INVESTIGATION consists of **06 pages** including cover page

INSTRUCTIONS TO LEARNERS

- ✓ Complete **Addendum A** and **B** after school and/ or during break time.
- ✓ Bring your **Data** along, to class.

ADDENDUM A – Measure your Pulse Rate

Procedure:

1. Sit down and turn one hand so that the palm is facing upwards.
2. To measure your pulse, place your middle and index finger gently, with sustained downward pressure, on your other hand's wrist on the radial side (against the radius) as illustrated in the sketch.

3. Move your fingers slightly until you feel a consistent beat.
4. Count the number of heartbeats in 20 seconds.
5. Use stopwatch/cell phone stopwatch. Record it.
6. Multiply this value by 3 to get the total number of heart beats per minute.
7. Repeat steps 1 to 5 three times.
8. Now calculate your **Average Resting Pulse Rate**.
9. Follow the steps outlined above and complete **Table 1** below.
10. Round-off to the nearest **Whole Number**.

Table 1

	Number of beats in 20 seconds	Number of beats in 1 minute
1		
2		
3		

(2)

QUESTIONS:

1. Calculate your average resting pulse rate. Show your calculation.

_____

_____

_____ (3)

2. Do **research** on the following two questions:

2.1 Why must you not measure your pulse rate with your thumb?

_____ (1)

2.2 Name **TWO** other places on the body where you can measure someone's pulse rate

_____

_____ (2)

ADDENDUM B – Investigate the effect of exercise on Pulse Rate

Instructions:

1. Pair up with one of your classmates. You will take turns doing the exercises and taking each other's pulse rates.

2. Before the exercise begins, note each person's resting pulse rate as determined in **ADDENDUM A** to complete **Table 2** below. This is the resting pulse rate for each exercise.

3. Take turns doing the exercises as shown in the table below. First you will do the exercise with your friend taking your pulse rate. Then she/he will do the exercise, and you will take her/his pulse rate. Make sure to complete each other's/person's table before you rotate.

4. **Precautions:**

- ✓ Take the person's pulse rate **Immediately** after the exercise has been completed.
- ✓ Let the person rest for **3 minutes** and take her pulse rate again.
- ✓ Wait until the person's pulse rate has returned to the resting state (more or less) before continuing with the next exercise.
- ✓ Enya's music below refers specifically to this song: **"May it be".**
- ✓ **Round-off all values to the nearest whole number.**

Table 2 of: _____ (your name)

Activity	Resting pulse rate	Pulse rate directly after exercise	Pulse rate after 3 minutes of rest
Jog for 2 minutes			
10 sit-ups			
Lie on back, hands on stomach and listen with closed eyes to Enya's music			

(2)

Table 2 of: _____ (your friend's name)

Activity	Resting pulse rate	Pulse rate directly after exercise	Pulse rate after 3 minutes of rest
Jog for 2 minutes			
10 sit-ups			
Lie on back, hands on stomach and listen with closed eyes to Enya's music			

(2)

PRACTICAL REPORT: Under Exam conditions during class time

1. Give a hypothesis for the investigation in **ADDENDUM B**.

_____

_____ (2)

2. What unit do we use to measure pulse rate?

_____ (1)

3. For the investigation in **ADDENDUM B** provide the:

3.1 Dependent variable.

_____ (1)

3.2 The independent variable.

_____ (1)

4. Provide **TWO** ways in which the reliability of the results can be ensured or improved.

_____

_____ (2)

5. Which activity caused the pulse rate to be the fastest?

_____ (1)

6. Which activity caused the pulse rate to be the slowest?

_____ (1)

7. What conclusion can you make about the relationship between heart rate and exercise?

_____

_____ (2)

8. Try to briefly provide a physiological explanation for the effect that you mentioned in **Question 7** above. (Try to explain why exercise has this effect on the heart rate.)

_____

_____

_____

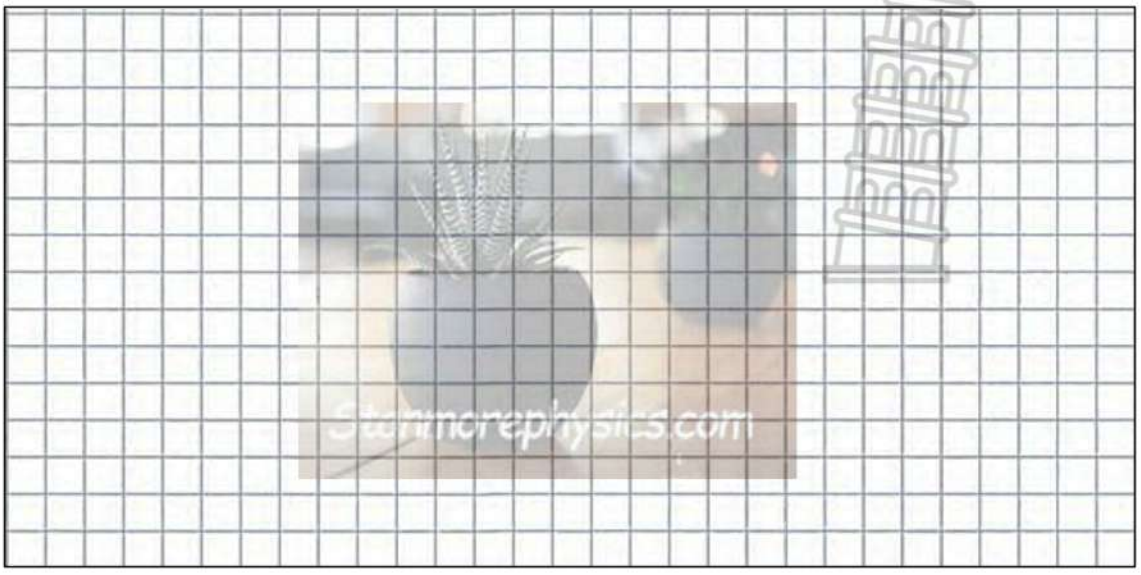
_____

_____

_____

_____ (4)

9. Use the information in **Table 2** of **ADDENDUM B** and draw a **Bar Graph** to compare your friend's pulse rate DIRECTLY AFTER EXERCISE for each activity.



(10)

10. Briefly try to explain any differences between you and your friend's heart rate with exercise.

_____

_____

_____

_____ (3)

TOTAL: 40

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GRADE 9

NATURAL SCIENCES

MARKING GUIDELINE

20 FEBRUARY 2026

MARKS:40

This Marking guideline consists of 3 pages

Learners must receive Addendum A and B with the tables beforehand so that they can collect the data on their own time. The practical report is then completed during class time, under exam conditions where each one must make their own conclusions from the data.

ADDENDUM A

Completes TABLE 1✓✓ (2)

1. Average = Tot number of beats✓ ÷ minute) ✓
   = correct answer✓ (3)

2. Research:
   a. The thumb has its own pulse / vein✓ (1)

   b. **MARK FIRST TWO**: Neck✓ (carotid pulse), groin✓, behind the knee, foot (pedal pulse), elbow (brachial pulse), temples (2)

ADDENDUM B

TABLE 2 x 2 completed ✓✓✓✓ (2 + 2)

PRACTICAL REPORT

1.1. Exercise✓ increases the pulse rate / heart rate✓. (2)

1.2. BPM / Beats per minute✓ (1)

1.3.

1.3.1. Heart rate / pulse rate✓ (1)

1.3.2. They type of activity / exercise ✓ (1)

1.4. Repeat the investigation✓ (2)
Increase the sample size✓

1.5. Look at the learner's specific answer✓ (1)

1.6. Look at the learner's specific answer✓ (1)

1.7. Exercise increases✓ the heart rate✓ OR (2)

The higher the intensity✓ of the exercise, the higher the heart rate✓.

1.8. During exercise the body/muscles require more energy✓ therefore more cell respiration✓ occurs and more oxygen✓ is required as it is a substrate for respiration. Heart rate increases to supply more oxygenated blood✓ to the cells / muscles. Adrenaline increases the heart rate too. ✓ (4)

1.9.

Correct type of graph	1 mark
Heading of the graph with both variables	2 marks
Correct label and unit of x-axis	1 mark
Correct label and unit of y-axis	1 mark
Correct scale for x- and y-axes and width of scale	1 mark
Use of key	1 mark
Plotting	1 mark: (1-3 points plotted correctly) 2 marks: (4-6 points plotted correctly)
Correct information represented - only pulse rates directly after exercise	1 mark
TOTAL	**10**

Commentary provided on the fitness level and variation in the pulse rates / recovery time. Look at the learner's specific values in Addendum B.

– Very little effort made✓
– average✓
– insightful✓ (3)

TOTAL: [40]