hypothesis is valid. The mirror can serve the purpose.

SNo.	Basis of assessment	Code	Criteria	Score	Award	Total
12	Conclusion	C	Well stated conclusion based on interpretation	2	C – 02	2
			Partially stated conclusion based on interpretation	1	C – 01	
			No or incorrect interpretation	0	C – 00	

Advice:
A parabolic mirror could serve better to concentrate both rays which are far and close the principal axis.

SNo.	Basis of assessment	Code	Criteria	Score	Award	Total
12	Advice given/ recommendation	AD	Correct/Appropriate/ relevant advise given based on findings.	1	AD – 01	1
			No/Incorrect/Inappropriate advise given	0	AD – 00	

			process data			
			No or incorrect method used to process data	0	DA – 00	

Data interpretation:

Reading intercepts, C_1 and C_2 on $\frac{1}{v}$ and $\frac{1}{u}$ axes respectively.

Finding focal length:

$$f = \frac{1}{2}\left(\frac{1}{C_1} + \frac{1}{C_2}\right)$$

$$C_1 = 0.094 \text{ cm}^{-1}$$

$$C_2 = 0.088 \text{ cm}^{-1}$$

$$f = \frac{1}{2}\left(\frac{1}{C_1} + \frac{1}{C_2}\right)$$

$$= \frac{1}{2} \times \left(\frac{1}{0.094} + \frac{1}{0.088}\right)$$

$$= \frac{1}{2} \times (11 + 11)$$

$$= \frac{1}{2} \times 22$$

$$= 11 \text{ cm}$$

SNo.	Basis of assessment	Code	Criteria	Score	Award	Total
11	Data interpretation (using the graph)	DI	Correct interpretation of data (s.f and d.p in calculations)	2	DI – 02	2
			Partially correct interpretation of data	1	DI – 01	
			No or incorrect interpretation of data	0	DI – 00	

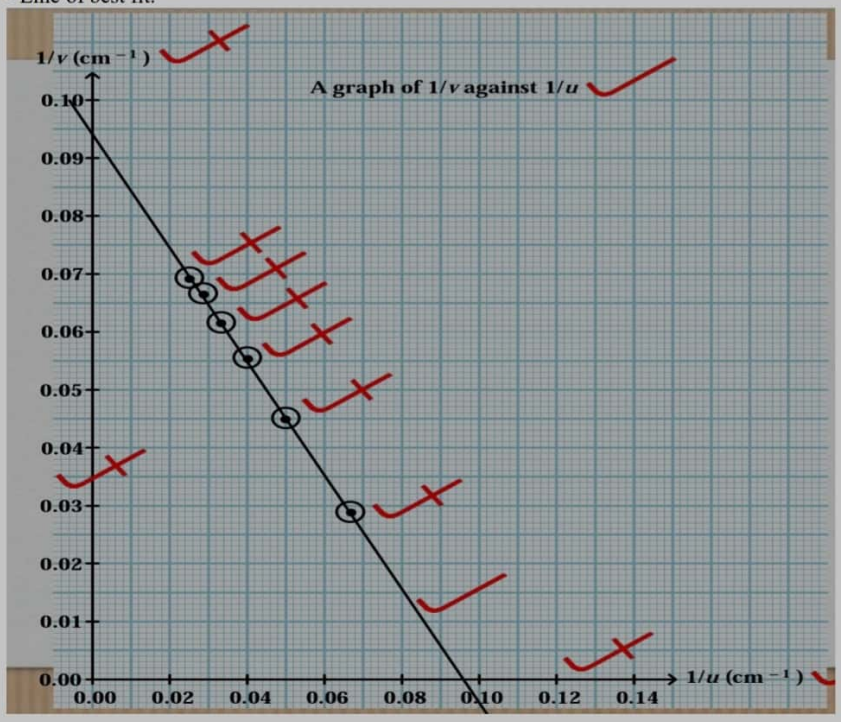
Conclusion:
The focal length of the concave mirror is 11.0 cm, close to that on the hypothesis hence the hypothesis is valid. The mirror can serve the purpose.

SNo.	Basis of	Code	Criteria	Score	Award	Total

			No or incorrect set of data stated	0	DS– 00	
	Accuracy of data(d.p and s.f)	AC	Correct accuracy of data stated	2	AC–02	2
			Partially correct accuracy of data stated	1	AC–01	
			No or incorrect accuracy of data stated	0	AC–00	

Data analysis:

- Title of the graph.
- (since origin must be zero)
- Correct plots.
- Line of best fit.



NB: Do not interprete the ticks you are seeing on the graph as marks, I personally " Lwanga William" use them for easy allocation of codes on the graph since in CBA of practicals, we use codes.

SNo.	Basis of assessment	Code	Criteria	Score	Award	Total
10	Data analysis	DA	Appropriate method used to process data (graph work needs)	2	DA – 02	2
			Partially appropriate method used to process data	1	DA – 01	
			No or incorrect method used to process data	0	DA – 00	

Presentation of data

Table of results - *correct units.*
- *table closed.*

u (cm)	$v \pm 0.1$ (cm)	$1/u$ (cm^{-1})	$1/v$ (cm^{-1})
15.0	34.5	0.0667	0.0290
20.0	22.1	0.0500	0.0452
25.0	18.0	0.0400	0.0556
30.0	16.2	0.0333	0.0617
35.0	15.0	0.0286	0.0667
40.0	14.4	0.0250	0.0694

Accuracy:

✓ Appropriate number of decimal points.

SNo.	Basis of assessment	Code	Criteria	Score	Award	Total
9	Presentation of data (table and units)	DP	Correct presentation of data	2	DP–02	2
			Partially correct presentation of data	1	DP–01	
			No or incorrect presentation of data	0	DP–00	
	Recording of data (data in correct column)	DR	Correct recording of data	2	DR–02	2
			Partially correct recording of data	1	DR–01	
			No or incorrect recording of data	0	DR–00	
	Set of data (in columns)	DS	Maximum set of data stated (3 +)	2	DS– 02	2
			Minimum set of data stated (1)	1	DS– 01	
			No or incorrect set of data stated	0	DS– 00	
	Accuracy of data(d.p and s.f)	AC	Correct accuracy of data stated	2	AC–02	2
			Partially correct accuracy of data stated	1	AC–01	
			No or incorrect accuracy of data stated	0	AC–00	

Data analysis:

- Title of the graph.
- (since origin must be zero)
- Correct plots

			experiment and setup are coherent			

			When procedures of the experiment and setup are partially coherent	1	PC – 01	
			When procedures of the experiment and setup are not coherent	0	PC – 00	

Possible errors:

✓ Parallax errors in reading distances on the metre rule.
(or: Inaccurate measurement of object and image distances).
✓ Failure to obtain a sharp clear image.

SNo.	Basis of assessment	Code	Criteria	Score	Award	Total
7	Sources of errors	ER	Most sources of error stated (2)	2	ER – 02	2
			Few sources of error stated (1)	1	ER – 01	
			No or incorrect sources of error stated	0	ER – 00	

Precautions:

✓ The object should be well illuminated in order to get a well illuminated image.
✓ The image on the screen should be sharp and clear (well defined).
✓ Avoid errors due parallax. (i.e. When measuring image and object distances, the eyes must be exactly perpendicular to the point where the reading/measurement is to be taken.)

SNo.	Basis of assessment	Code	Criteria	Score	Award	Total
8	Precautions	PR	All relevant precautions stated	2	PR – 02	2
			Partially relevant precautions stated	1	PR – 01	
			No or incorrect precautions stated	0	PR – 00	

Presentation of data

Table of results - *correct units.*
- *table closed.*

Procedure:

a) Illuminated wire gauze is placed in front of concave mirror at distance, $u = 15.0$ cm, as shown in the diagram given.

(Distance should be greater than the focal length for a real image to be formed)

b) A screen is introduced in between the illuminated object and the mirror without obstructing the light rays.

c) The position of the screen is adjusted until a sharp clear image of wire is formed on it.

d) The distance, v, between the screen and the mirror is measured and recorded.

e) The experiment is repeated with for values of $u = 20.0, 25.0, 30.0$ and 35.0 cm.
f) The corresponding values of v are measured and recorded.

g) The results are recorded in a suitable table including values of $\frac{1}{u}$ and $\frac{1}{v}$.

SNo.	Basis of assessment	Code	Criteria	Score	Award	Total
5	Procedure of experiment and setup Drawing of experiment setup	D	Correct or complete well drawn and labelled	2	D – 02	2
			Partially labelled	1	D – 01	
			No or incorrect or wrong drawing	0	D – 00	
SNo.	Basis of assessment	Code	Criteria	Score	Award	Total
6	Procedure of the experiment Relevance	PR	All relevant procedures of the experiment and setup stated	2	PR – 02	2
			Partially relevant procedures of the experiment and setup stated	1	PR – 01	
			No or irrelevant procedures of the experiment and setup stated	0	PR – 00	
	Coherence	PC	When procedures of the experiment and setup are coherent	2	PC – 02	2

When procedures of the 1 PC – 01

		VD	Correct dependent variable stated	1	VD – 01
			No or incorrect dependent variable stated	0	VD – 00
		VC	Correct independent variable stated	1	VC – 01
			No or correct independent variable stated	0	VC – 00

Hypothesis:
The focal length of the mirror is 10 cm.

SNo.	Basis of assessment	Code	Criteria	Score	Award	Total
3	Hypothesis	H	Correct Hypothesis stated	1	H – 01	1
			No or incorrect Hypothesis stated	0	H – 00	

List of apparatus:

- A screen
- Screen with wire gauze
- A torch bulb
- Connecting wires
- A metre rule
- A concave mirror
- Dry cells in a cell holder.

Note: A complete list depends on the learner's procedure. All apparatus in procedure should be listed here.

SNo.	Basis of assessment	Code	Criteria	Score	Award	Total
4	List of apparatus and materials	AP	All relevant apparatus and materials stated	2	AP – 02	2
			Partially relevant apparatus and materials stated	1	AP – 01	
			No or irrelevant apparatus and materials stated	0	AP – 00	

Using intercept, C_2 on the $\frac{1}{u}$ axis

$$\frac{1}{f}=\frac{1}{u}+\frac{1}{v}, \quad \Rightarrow \frac{1}{f}=C_2+0, \quad \therefore f=\frac{1}{C_2}$$

Adding the two equations gives:

$$2f=\frac{1}{C_1}+\frac{1}{C_2}, \quad \therefore f=\frac{1}{2}\left(\frac{1}{C_1}+\frac{1}{C_2}\right)$$

Expected response:

Aim:

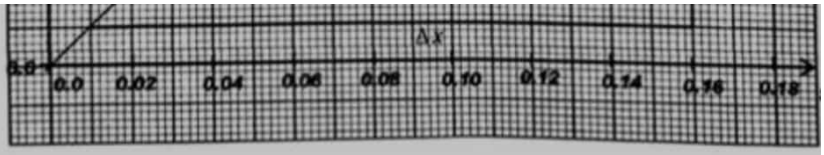
The aim of the experiment is to determine the focal length of the concave mirror provided.

SNo.	Basis of assessment	Code	Criteria	Score	Award	Total
1	Aim of the experiment	A	Properly stated aim	2	A – 02	2
			Partially stated aim	1	A – 01	
			No or incorrect aim	0	A - 00	

Partially stated: The aim of the experiment is to determine the focal length of the mirror.The aim of the experiment is to calculate the focal length of the concave mirror.
Incorrect: Convex mirror seen, plane mirror seen, lens seen.
Variables:

- Independent Variable is the distance, u, of the mirror from the wire gauze.
- Dependent variable is the distance, v, of the screen from the mirror.
- Control variable is the amount of light.

SNo.	Basis of assessment	Code	Criteria	Score	Award	Total
2	Variables of the experiment	V I	Correct independent variable stated	1	VI – 01	3
			No or incorrect independent variable stated	0	VI – 00	



Conclusion

In this experiment, I have been successful to prove the aim of the experiment which is Hooke's law. The results obtained were correct with minimal errors and therefore the slope in the graph indicates the value spring constant, $k = 46.89$ kg s^{-1} which was closed to the labelled value of 45 kg s^{-1}. I feel that my data is reliable and the graph does show that the extension of the spring is directly proportional to the force that is applied to it

Ex: Item 2:

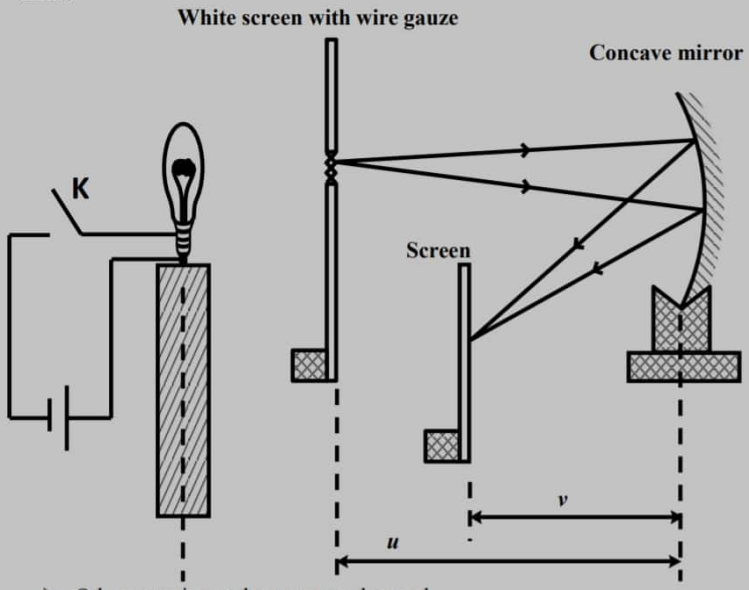
In towns of Uganda, most families use charcoal for cooking food. This influences cutting of trees for charcoal production, which has a devastating effect onthe globe. Experts advice the citizens to use alternative means; and among these include use of solarconcentrators made of concave mirror of focal length 10.0 cm. As such, some youths went to a shop looking for a concave mirror of such specification tomake a solar concentrator but found only one concave mirror without any label.

They decided to seek for help.

Task:

As a physics student, carry out a scientific investigation to determine whether the available mirror can serve the purpose.

Hint:



- Other experimental setups may be used
- $\frac{1}{f}=\frac{1}{u}+\frac{1}{v}$ and $f=\frac{1}{2}\left(\frac{1}{C_1}+\frac{1}{C_2}\right)$; where C_1 and C_2 are intercepts on the $\frac{1}{v}$ and $\frac{1}{u}$ axes respectively.

Background manipulations:

Using intercept, C_1 on the $\frac{1}{v}$ axis

$$\frac{1}{f}=\frac{1}{u}+\frac{1}{v}, \quad \Rightarrow \frac{1}{f}=0+C_1$$

$$\therefore f=\frac{1}{C_1}$$