# Just a Little Bit of Effort: Exploring Levers

Student Activity 2A

Data Sheet

## I. Exploring First Class Levers

### Table 1 Exploring First Class Levers

| Location of Effort (cm) | Distance Between Fulcrum and Effort (cm) | Effort Force (N) | Location of Resistance (cm) | Distance Between Resistance and Fulcrum (cm) | Resistance Force (N) |
|---|---|---|---|---|---|
| 3 | | | 13 | | |
| 13 | | | 8 | | |
| 5 | | | 10 | | |
| 10 | | | 5 | | |
| 6 | | | 12 | | |
| 12 | | | 6 | | |
| 3 | | | 9 | | |
| 9 | | | 3 | | |

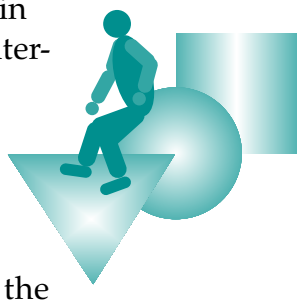
## Processing Out:

1. Draw the first set up of your first class lever. Be sure to label the fulcrum, effort and resistance and the location of each in cm.

2. How much effort did it take to lift the resistance of 1 N when the effort and the resistance were the same distance from the fulcrum? _____

3. Would this arrangement make your work less if you had to move a heavy object? Why or why not? _____
_____
_____

4. As the resistance was moved closer to the fulcrum, and the effort was left in the same location, what happened to the amount of effort needed to counter-balance the resistance?



_____
_____
_____

5. When you moved the resistance and effort as described in question 3, did the move make this lever more efficient? Why or why not?

_____
_____

6. Look at your data in Table 1 **Exploring First Class Levers**. When the Resistance was further from the fulcrum than the Effort, what happened to the amount of Effort required to balance the resistance?

_____
_____

7. What is the effect of distance from the fulcrum on this lever system? (Be sure to discuss both Resistance (load) and Effort.)

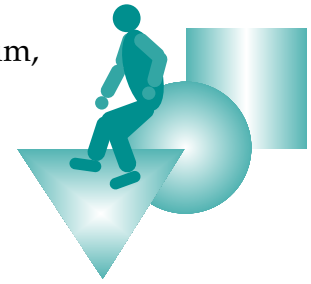
_____
_____

## II. Exploring Second Class Levers (Put the fulcrum at 2cm)

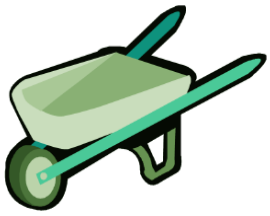
### Table 2 Exploring Second Class Levers

| Location of Effort (cm) | Distance Between Fulcrum and Effort (cm) | Effort Force (N) | Location of Resistance (cm) | Distance Between Resistance and Fulcrum (cm) | Resistance Force (N) |
|---|---|---|---|---|---|
| 28 | | | 6 | | |
| 28 | | | 8 | | |
| 28 | | | 10 | | |
| 20 | | | 6 | | |
| 18 | | | 6 | | |
| 15 | | | 6 | | |
| 20 | | | 10 | | |
| 25 | | | 15 | | |

## Processing Out:



1. Draw the first set up of your second class lever. Be sure to label the fulcrum, effort and resistance and the location of each in cm.



2. How much effort did it take to lift the resistance of 1 N in the first set up of this lever? _____

3. Would this arrangement make your work less if you had to move a heavy object? Why or why not?

_____

_____

4. When the resistance was moved closer to the fulcrum, and the effort stayed in the same location, what happened to the amount of effort needed to counterbalance the resistance?

_____

_____

5. When you moved the resistance and effort as described in question 3, did the move make this lever more efficient? Why or why not?

_____

_____

_____

6. Look at your data in **Table 2 Exploring Second Class Levers**. When the Resistance was further from the fulcrum and the location of the effort stayed the same, what happened to the amount of Effort required to counterbalance the resistance?

_____

_____

7. What is the effect of distance from the fulcrum on this lever system? Be sure to discuss both Resistance (load) and Effort).

_____

_____

## III. Exploring Third Class Levers (Put the fulcrum at 2cm)

### Table 3 Exploring Third Class Levers

| Location of Effort (cm) | Distance Between Fulcrum and Effort (cm) | Effort Force (N) | Location of Resistance (cm) | Distance Between Resistance and Fulcrum (cm) | Resistance Force (N) |
|---|---|---|---|---|---|
| 15 | | | 28 | | |
| 10 | | | 28 | | |
| 10 | | | 28 | | |
| 10 | | | 20 | | |
| 15 | | | 18 | | |
| 10 | | | 15 | | |
| 6 | | | 20 | | |
| 6 | | | 25 | | |

## Processing Out:

1. Draw the first set up of your third class lever. Be sure to label the fulcrum, effort and resistance and the location of each in cm.

2. How much effort did it take to lift the resistance of 1 N in the first set up of this lever?

   _____

3. Would this arrangement make your work less if you had to move a heavy object? Why or why not?

   _____

   _____

4. When the resistance was moved closer to the fulcrum, and the effort stayed in the same location, what happened to the amount of effort needed to counterbalance the resistance?

_____
_____
_____

5. When you moved the resistance and effort as described in question 3, did the move make this lever more efficient? Why or why not?

_____
_____
_____

6. Look at your data in **Table 3 Exploring Third Class Levers**. When the Resistance was further from the fulcrum and the location of the effort stayed the same, what happened to the amount of Effort required to counterbalance the resistance?

_____
_____
_____

7. What is the effect of distance from the fulcrum on this lever system? (Be sure to discuss both Resistance (Load) and Effort).

_____
_____

8. What unexpected results did you find when you worked with the third class lever?

_____
_____

## IV. The Little Bit of Effort Contest Contest

### Table 4 "Little Bit of Effort" Contest (Ratio of Resistance/Effort)

Name(s) _____

**"Little Bit of Effort" Contest Entry Form**

| FIRST CLASS | | SECOND CLASS | | THIRD CLASS | |
|---|---|---|---|---|---|
| RESISTANCE Force (N) | EFFORT Force (N) | RESISTANCE Force (N) | EFFORT Force (N) | RESISTANCE Force (N) | EFFORT Force (N) |
| R/E | | | | | |
| | | | | | |