

Masters for
TeachersThis section includes duplication masters and transparency
masters.

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Guidelines for Working with the CBL[™] and Motion Sensor

- Make certain you have a clear walkway 15 to 20 feet in length as measured from the motion sensor. The motion sensor should be placed approximately 3 to 4 feet off the floor at one end of the walkway facing the opposite end. The walkway should be wide enough to ensure that no objects other than the walker are detected by the sensor.
- The walker should stay in front of the motion sensor as he or she is moving. Other group members should stay clear of the walkway.
- When walking, come no closer than 1.5 feet away from the sensor since it can not accurately measure distances smaller than this.
- The motion sensor is collecting data whenever the small red light on its front is on. If the room is quiet, you can also hear the sensor making a soft clicking sound as it collects data.
- Once started, the sensor will measure a walker's distance every 0.1 seconds for a period of 6 seconds. Each (time, distance) measurement will be sent to the calculator and plotted on a graphing screen. For example, if a walker were 5.36 feet from the sensor 3.7 seconds after starting, the ordered pair (3.7, 5.36) would be plotted somewhere on the graphing screen.
- All graphing windows have the same dimensions. The program operating the CBL has set the graphing windows so that the horizontal axis (x-axis) starts at a time of 0 seconds and ends at a time of 6 seconds with a scale of 0.1 (distance between tick marks). The vertical axis (y-axis) starts at a distance of 0 feet and ends at a distance of 20 with a scale of 1.0.



Time in Seconds

The HIKER Program for the TI-82

The HIKER program listed in two columns below is best downloaded into a calculator using a TI-Graph Link[™]. If you must enter the program by hand, consult the calculator manual for help in locating various commands. Once the program is entered into one calculator it can be downloaded to others using the Linking features available on the TI-82 and TI-83 calculators.

```
Disp ""
Grid0ff
                                                                         Output(6,1," STATUS: O.K."
AxesOff
                                                                         Output(8,10,"[ENTER]")
Label0ff
Plots0ff
                                                                         Pause
Fn0ff
                                                                         ClrDraw
ClrDraw
                                                                         C1rHome
Text(1,16,"TEXAS INSTRUMENTS")
Text(8,30,"CBL SYSTEM")
Text(15,10,"EXPERIMENT WORKBO
Text(29,28,"HIKER V1.2")
Text(36,18,"(EXPERIMENT M1)")
Text(50,6,"PRESS [ENTER] ON
                                                                         Func
                                                                         Axes0n
                                     WORKBOOK")
                                                                         ClrList L2,L3
                                                                         0→Xmin
                                                                         6→Xmax
                                                  TI-82"
                                          ΟN
                                                                         .1→Xscl
Pause
                                                                         0→Ymin
Disp "TURN ON THE CBL.
                                                                         20⇒Ymax
Output(4,10,"[ENTER]")
                                                                         1⇒Yscl
Pause
                                                                         60→dim L2
FullScreen
                                                                         60⇒dim L3
C1rHome
                                                                         seq(I,I,.1,6,.1)→L2
{6,0}→L1
Disp "NOW CHECKING THE"
Disp "CALCULATOR-CBL"
                                                                         Send(L1)
Disp "LINK CONNECTION."
Disp "PLEASE WAIT...."
                                                                         {1,0}>L1
                                                                         Send(L1)
{6,0}→L1
                                                                         {1,11,3}→L1
Send(L1)
                                                                         Send(L1)
{1,0}→L1
                                                                         C1rHome
                                                                         Disp "PRESS ENTER"
Disp "TO START"
Send(L1)
{0}→L2
Lb1 M
                                                                         Disp "GRAPH"
{7}→L1
                                                                         Pause
Send(L1)
                                                                         ClrDraw
                                                                         Text(4,1,"DIST")
Get(L2)
If dim L2=1 and L2(1)=0
                                                                         Text(51,78,"TIME")
                                                                         {3,.1,-1,0}→L1
Send(L1)
Then
C1rHome
Disp "***LINK ERROR***"
Disp "PUSH IN THE LINK"
Disp "CORD CONNECTORS"
Disp "FIRMLY THEN HIT"
Disp "[ENTER]."
                                                                         For(I,1,60,1)
                                                                         Get(L3(I))
                                                                         Pt-On(L2(I),L3(I))
                                                                         End
                                                                         Plot1(Scatter,L2,L3,·)
Pause
                                                                         Stop
Goto M
End
```

PROGRAM CONTINUES IN SECOND COLUMN

The HIKER Program for the TI-83

The HIKER program listed in two columns below is best downloaded into a calculator using a TI-Graph Link[™]. If you must enter the program by hand, consult the calculator manual for help in locating various commands. Once the program is entered into one calculator it can be downloaded to others using the Linking features available on the TI-82 and TI-83 calculators.

GridOff	Disp ""
AxesUff	Output(6,1," STAIUS: O.K."
LabelUff	Output(8,10,"[ENTER]")
PlotsUff	Pause
FnOff	Func
CIrDraw	CIrHome
Text(1,16, "TEXAS INSTRUMENTS")	CIrDraw
Text(8,30,"CBL SYSTEM")	AxesOn
Text(15,10,"EXPERIMENT WORKBOOK")	ClrList L2,L3
Text(29,28,"HIKER V1.2")	O⇒Xmin
Text(36,18,"(EXPERIMENT M1)")	6→Xmax
Text(50,6,"PRESS [ENTER] ON TI-83"	.1→Xscl
Pause	O⇒Ymin
ClrHome	20→Ymax
Disp "TURN ON THE CBL."	1 → Ysc]
Output(4,10,"[ENTER]")	60 → dim(2
Pause	60 → dim(13
Full	seg(I.I.,1.6.,1) → 12
ClrHome	{6,0} → 1
Disp "NOW CHECKING THE"	Send(L1)
Disp "CALCULATOR-CBL"	$\{1,0\} \rightarrow [1]$
Disp "LINK CONNECTION."	Send(L1)
Disp "PLEASE WAIT"	{1,11,3}€1
{1.0} → L1	Send(11)
Send(L1)	ClrHome
{0} → 2	Disp "PRESS ENTER"
LĎÍ M	Disp "TO START"
{7} → 1	Disp "GRAPH"
Send(11)	Pause
Get(12)	ClrDraw
If dim $ 2=1$ and $ 2(1)=0$	$T_{OV} + (A_1 "DIST")$
Then	$T_{ext}(51.78, "TIMF")$
ClrHome	$\{3, 1, -1, 0\} \rightarrow [1]$
Disp "***LINK FRROR***"	$\{3, 1, 1, 1, 0\} \neq L1$
Disp "PUSH IN THE LINK"	For(I = 1, 60, 1)
Disp "CORD CONNECTORS"	$G_{0}^{+}(13(1))$
Disp "FIRMLY THEN HIT"	$D_{+} = O_{n}(12(1) + 3(1))$
Disp "[FNTER] "	$\mathbf{F}_{\mathbf{C}} = \mathbf{C}_{\mathbf{C}} = $
	Plot1(Scatton 2 3)
Goto M	Ston
End	3.0P
PROGRAM CONTINUES IN SECOND COLUMN	