EXPLORATIONS

Appendix

Teacher Information

This section provides general information, practice data, and answers for the student activities.

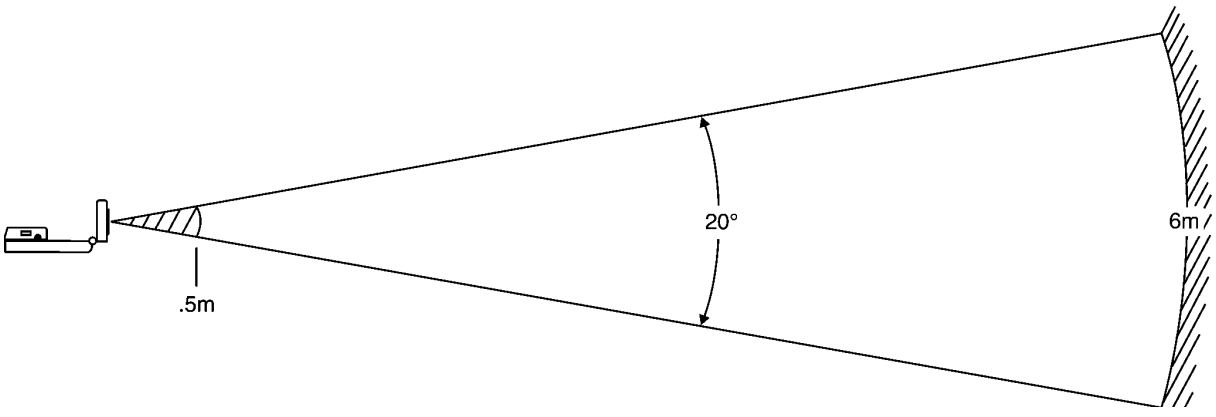
Activity Notes

- The CBR setup instructions are included in each activity.
- If you need additional information, refer to the *Getting Started with CBR* manual included with the CBR.
- Remind students that the CBR records motion in front of it, not to the side.
- Be sure that students stay within the range of the CBR (0.5 – 6 meters).
- Most students prefer to face the CBR when walking. This allows them to stay directly in front of the unit during data collection.

The Clear Zone

The path of the CBR beam is not a narrow, pencil-like beam, but fans out in all directions up to 10° in a cone-shaped beam.

To avoid interference from other objects in the vicinity, try to establish a clear zone in the path of the CBR beam. This helps ensure that objects other than the target are not recorded by the CBR. The CBR records the closest object in the clear zone.



Activity 8 — Bouncing Ball

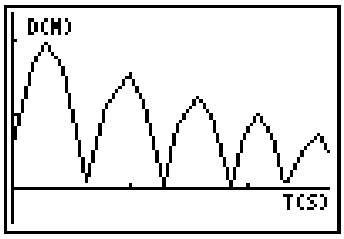
Collecting the Data

- Avoid using a soft or felt-covered ball such as a tennis ball, since pulses from the CBR tend to be absorbed by these surfaces.
- If you have trouble obtaining good results, try using a larger ball.
- To expedite data collection, designate three students: one to hold the CBR, one to release the ball, and one to run the calculator.
- For best results, hold the sides of the ball, and then quickly move your hands outward to release the ball.

When your students perform this activity, the results will look similar to the examples below.

Note: The data in these tables is simulated. Actual data will be slightly different.

List L1	List L2
0	0.53
0.16	1.66
0.28	1.95
0.44	1.64
0.64	0.07
0.8	1.11
1	1.52
1.12	1.12
1.28	0.02
1.4	0.85
1.56	1.21
1.68	0.97
1.84	0.02
1.96	0.73
2.08	0.96
2.2	0.73
2.32	0
2.44	0.5
2.6	0.72
2.68	0.5



Looking at the Results

1. First bounce: 1.95 m
   Second bounce: 1.52 m
   Third bounce: 1.21 m
   Fourth bounce: 0.96 m
2. Bounce ratios: 1.52/1.95; 1.21/1.52; 0.96/1.21
3. Rebound percents: 78, 80, 79
4. Each time the ball rebounded, its new height was 79 percent of its previous height.
5. Answers will vary. In general, a different starting height will not significantly affect the rebound percentage.
6. Answers will vary. In general, the "bouncier" a ball, the higher its rebound percentage will be.

Going Further

1. The rebound percentages would be the same since both terms of the ratio would be scaled by a constant multiple.
2. First bounce: (12 m)(0.79) = 9.48 m
   Second bounce: (9.48 m)(0.79) = 7.49 m
3. Second bounce: (1.5 m)(0.85) = 1.28 m
   Third bounce: (1.28 m)(0.85) = 1.08 m
   Fourth bounce: (1.08 m)(0.85) = 0.92 m
4. On the sixth bounce, the height is 0.57 meters, and on the seventh bounce, it is 0.48 meters. So it would have to bounce seven times for the rebound height to be under 50 centimeters.