

DOES A BOOK HAVE ENERGY?

A. Question: *Can energy be transferred?*

B. Materials Needed:

1. A heavy book (encyclopedia or dictionary).
2. A meter stick, pencil and eraser.
3. A high stool.

C: Procedure:

1. Place a stool on the table top and put a heavy book on the stool. Ask students: “Does the book have any energy at this position?”
2. Place the meter stick on the table top about 20-30cm in front of the stool, such that when the book is pushed off the stool, it will fall on the end ruler.
3. Insert a thin pencil under the meter stick, about one-third from the end where the book will be falling on.
4. Place an eraser on the other end of the meter stick.
5. Push the book off the stool (and let it fall on the meter stick). Observe the eraser fly up!

D: Anticipated Results:

Students should observe the transfer of energy throughout the process.

E: Thought Questions for Class Discussion:

1. What kind of energy did the book have when it was lying on the stool? When it was falling on the ruler?
2. Does the book have any energy lying on the table top?
3. What type of energy did the book impart on the meter stick?
4. What kind of energy did the eraser obtain?
5. What was the original source of energy that triggered the flying eraser?

F: Explanation:

When the book was lying on the top of the stool, it had potential energy. As long as the book has the potential of falling towards the center of the earth, it has potential energy. Thus when it was lying on the table top after falling off the stool, it still possesses potential energy (to fall off the table and send another eraser flying). At the moment that the book was falling, this potential energy was transformed into kinetic energy, which was turned into mechanical energy of the moving meter stick, and this was imparted to the eraser, which obtained kinetic energy.

The original source of energy of this whole chain reaction was human muscle energy, which can be traced back to solar energy.