

Spool Tractor



QUESTION: What makes a spool tractor move?

MATERIALS:

paper clip
rubber bands
masking tape
skewer (6")

toothpick
thread spool (2½)
washer (1¼")

PROCEDURE:

1. Build a Spool Tractor as described in the Spool Tractor Direction sheet.



2. Wind your spool tractor up and see how far it can go. Record your distance in the Data table.
3. Repeat Step #2 four more times. Record the distance the spool tractor goes each time.

DATA:

TRIAL	DISTANCE
Trial 1	
Trial 2	
Trial 3	
Trial 4	
Average	

PS – Activity #26

QUESTIONS:

1. At what point does the spool tractor have the greatest potential energy?
2. At what point does the spool tractor have the greatest kinetic energy?
3. Draw a diagram that shows how energy changes form in this activity.
4. Describe all the forces that impede the movement of the spool tractor when it is released.
5. What type of surface works best for the spool tractor to travel?
6. What provides the power to move the spool tractor?
7. What factors cause the spool tractor to stop?

PS – Activity #26

Spool Tractor Directions

1. Straighten out the paperclip so that has a hooked end, but the rest of the paper clip is a straight wire.
2. Loop the rubber band over the hooked end of the paper clip and thread the straight end of the paper clip through the hole in the spool.
3. With the loose end of the rubber band extending beyond the edge of the spool, insert a short piece of the toothpick (about $\frac{1}{2}$ " long) through the rubber band to keep it from being pulled through the spool as you pull the rubber band through the spool. Place about a one-inch piece of masking tape on the piece of toothpick to keep it secure.
4. When you get the loose end of the rubber band through to the other side of the spool, grasp it firmly and take it off the paper clip hook. Be careful not to let go of the end. Pull it up so that you can feed the end of the paper clip through the washer.
5. Once the washer is on, stick the skewer through the rubber band so that there is about a 4" tail. Use the long tail of the skewer to wind the spool tractor up.
6. When you feel moderate resistance in the skewer, place the spool tractor on a flat surface and let it go.
7. Do this several times to get a feel for how tightly to wind the rubber band. If the rubber band breaks, you will need to start again at the beginning of these directions.

