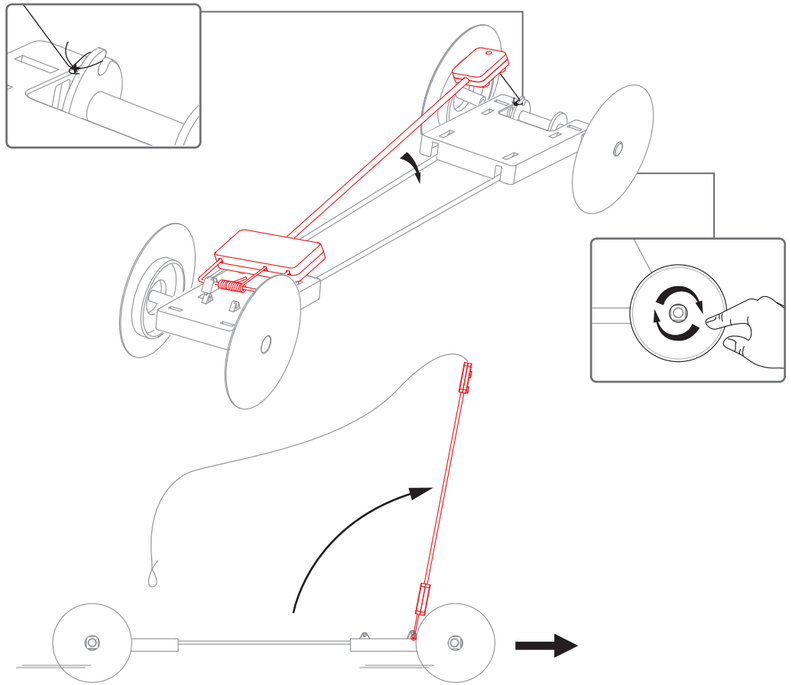
D. OPERATION

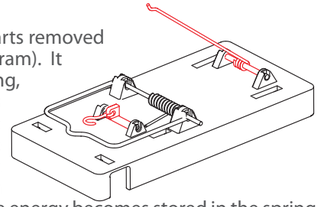
1. You need a long, straight section of floor for your Mousetrap Racer to race along.
2. Put the Mousetrap Racer on the floor with the rear end nearest you. Gently lift the arm with one hand and attach the string loop onto the hook on the winding drum with the other hand. Slowly turn the wheels backwards to wind the string around the drum (make sure the string stays in the central section of the drum).
3. Keeping hold of the rear wheels, put the Mousetrap Racer at the start of your race track, then carefully release it. Mousetrap Racer should slowly accelerate away and keep going until all the string fully unwinds.



E. TROUBLE SHOOTING

- The rear wheels of your Mousetrap Racer could spin on a very smooth floor. If they do not, move to a less slippery surface, where the grip will be better.
- If the large wheel slip on the small wheels, you can put a piece of adhesive tape over their centres to stick the large wheel to the small wheel hubs.
- If the Mousetrap Racer steers left or right, loosen the screws under the narrow baseplate, twist the baseplate gently left or right to balance the chassis, then re-tighten the screws.

F. HOW DOES IT WORK?



The front baseplate is a mousetrap with some of its parts removed (the removed parts are marked in red on the diagram). It contains a coiled spring. When you wind up the string, the arm on the spring rotates and the spring becomes more tightly coiled. When you release the Racer, the spring uncoils again, pulling the string and turning the drum and wheels. You can also think of the spring as a device for storing energy, called elastic energy. When you raise the arm, you use energy to coil the spring. The energy becomes stored in the spring. When you release the Racer, this energy is slowly released, and is turned into movement energy of the Racer.

G. WHAT'S NEXT

Replace the four wheels with old CDs. Does your Racer go further and faster? Can you think of why? Shiny CDs make the Racer look great too. Try removing the large wheels and letting the Racer run on small wheels. What happens now? Can you think of other ways of making the Racer go further or faster?

H. FUN FACTS

- When the spring in Mousetrap Racer is twisted, the metal in the spring is stretched in some places and squashed in others. When the spring is released, the metal returns to shape, making the spring uncoil.
- Springs also store elastic energy when they are bent, stretched or squashed.
- Springs store energy in mechanical clocks and watches. Winding the clock or watch tightens a coiled spring. The spring gradually unwinds, moving the parts of the clock or watch.
- Other materials can store elastic energy too. For example, a twisted elastic band stores energy in a rubber-band-powered model aeroplane.
- In ancient times, war machines called catapults used a twisted rope to fire missiles on the end of an arm.
- The humble wooden clothes peg uses a spring like the one in Mousetrap Racer to squeeze its jaws together.
- In a real mousetrap, the spring is held in its sprung position by a clip attached to a pad. The spring is released when a mouse steps on the pad.
- Mousetrap-powered and elastic-band-powered car competitions are popular. Cars compete for speed and distance travelled.

QUESTIONS & COMMENTS

We value you as a customer and your satisfaction with this product is important to us. If you have comments or questions, or you find any part of this kit missing or defective, please do not hesitate to contact our distributor in your country. You will find the address printed on the package. You are also welcome to contact our Marketing Support Team: Email: infodesk@4m-ind.com, Fax (852) 25911566, Tel: (852) 28936241, Web site: WWW.4M-IND.COM

41-03908/1

SCIENCE IN ACTION

MOUSETRAP RACER

⚠ WARNING

THIS IS NOT A TOY. THIS IS INTENDED TO BE AN EDUCATIONAL KIT WHICH DEMONSTRATES A SCIENCE PRINCIPLE IN A FUN WAY. ALL ASSEMBLY AND OPERATION OF THE PROJECT SHOULD BE DONE AND SUPERVISED BY AN ADULT. READ ALL INSTRUCTIONS BEFORE YOU START.

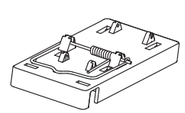
A. SAFETY MESSAGES

1. This is not a toy. This is intended to be an educational kit which demonstrates a science principle in a fun way. All assembly and operation of the project should be done and supervised by an adult or child aged 14 or over. Read all instructions before you start.

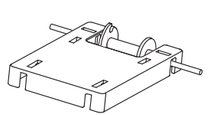
2. This kit contains a powerful spring that could potentially hurt fingers. Never pull back and release the spring or winding arm except as detailed in these instructions. Always exercise care when building and operating the Racer, especially when winding the string and releasing the arm. Never allow the arm to spring towards your body. We recommend that you wear goggles to protect your eyes when operating the Racer.

3. This kit and its finished product contain small parts which may cause choking if misused. Keep away from children under 3 years old.

B. CONTENTS



1 front baseplate (narrow) with spring and wire frame installed

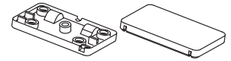


1 rear baseplate (wide) with axle and winding drum installed

1 adhesive foam

screws

1 set arm cap case (base and cover)



1 set arm holder case (base and cover)

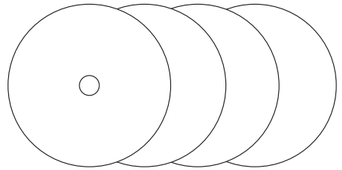
1 short axle

1 string

4 small wheels

2 connecting rods

1 winding arm



4 large wheels

Also needed, but not included in this kit: a small cross-head screwdriver

C. ASSEMBLY

1. Push the two connecting rods into the tunnels on the underside of the front baseplate. Make sure they are fully inserted before fixing them in place with two screws.

2. Push the free ends of the two connecting rods into the rear baseplate. Make sure they are fully inserted before fixing them in place with two screws.

3. Lay one end of the winding arm into the cover of the arm cap case base (the base has a peg, in the centre), making sure that the loop on the arm wraps around the peg. Put the cover over the base. Secure the base and cover with four screws.

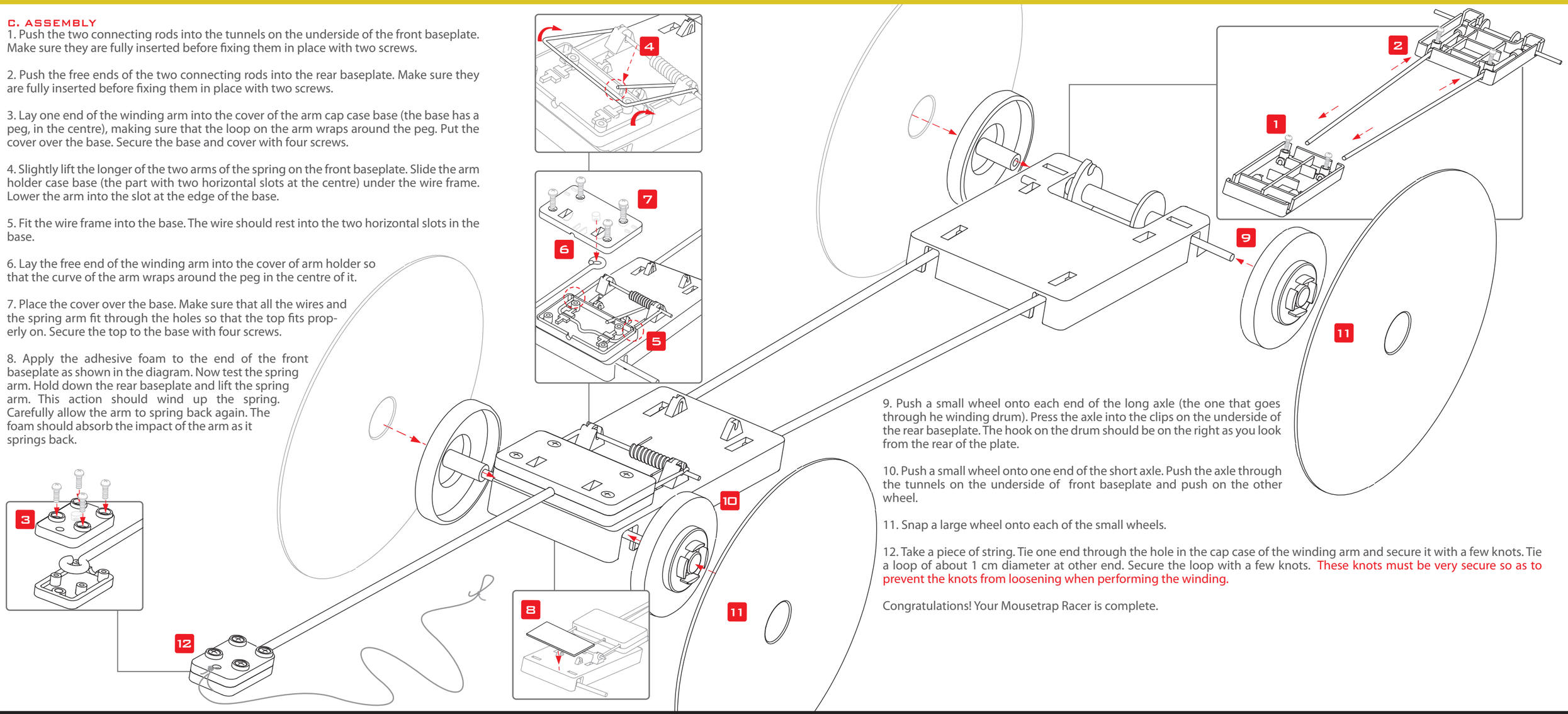
4. Slightly lift the longer of the two arms of the spring on the front baseplate. Slide the arm holder case base (the part with two horizontal slots at the centre) under the wire frame. Lower the arm into the slot at the edge of the base.

5. Fit the wire frame into the base. The wire should rest into the two horizontal slots in the base.

6. Lay the free end of the winding arm into the cover of arm holder so that the curve of the arm wraps around the peg in the centre of it.

7. Place the cover over the base. Make sure that all the wires and the spring arm fit through the holes so that the top fits properly on. Secure the top to the base with four screws.

8. Apply the adhesive foam to the end of the front baseplate as shown in the diagram. Now test the spring arm. Hold down the rear baseplate and lift the spring arm. This action should wind up the spring. Carefully allow the arm to spring back again. The foam should absorb the impact of the arm as it springs back.



9. Push a small wheel onto each end of the long axle (the one that goes through he winding drum). Press the axle into the clips on the underside of the rear baseplate. The hook on the drum should be on the right as you look from the rear of the plate.

10. Push a small wheel onto one end of the short axle. Push the axle through the tunnels on the underside of front baseplate and push on the other wheel.

11. Snap a large wheel onto each of the small wheels.

12. Take a piece of string. Tie one end through the hole in the cap case of the winding arm and secure it with a few knots. Tie a loop of about 1 cm diameter at other end. Secure the loop with a few knots. These knots must be very secure so as to prevent the knots from loosening when performing the winding.

Congratulations! Your Mousetrap Racer is complete.