

Runalong Robot - Introduction

A fun robot model that runs along with head bobbing and arms moving

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Parts List

Making pages

Activities

- 1) Assemble the 'robot base'
- 2) Add 'cam and follower'.
- 3) Make 'robot head' then add it.
- 4) Add 'arms' to 'robot head' part.
- 5) Test by pushing along
(do this on carpet or similar floor)

If time

- 6) Add Electrics
 - a) Add motor and pulley
 - b) Connect battery to motor
- 7) Turn on - Test it works

Key Words / Knowledge

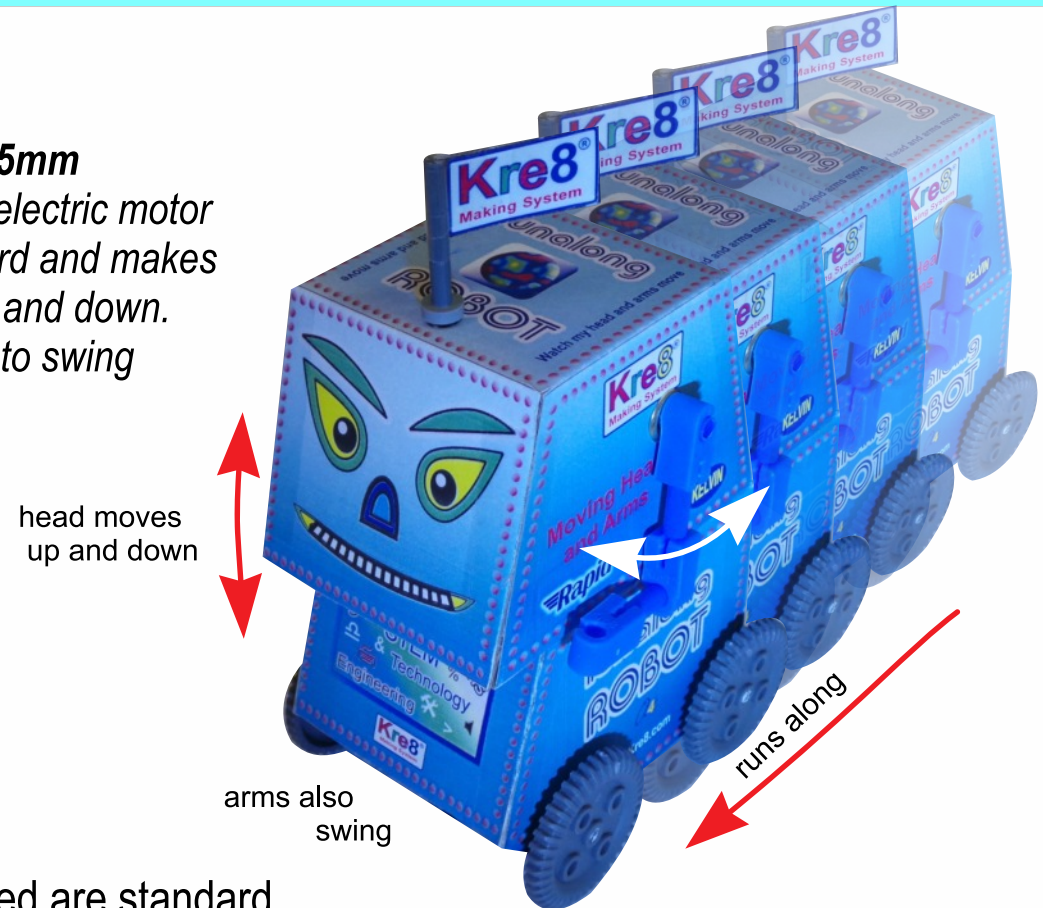
Science - Electricity, energy conversion, motor, force, bearings, kinetic energy, friction, rolling resistance, testing, efficiency, power, voltage and current.
 Practical Maths - nets, angles, surface area, gear ratios, ways of measuring, cost exercises

Features

180mm high x 105mm

This robot has an electric motor that drives it forward and makes the head move up and down.

The arms are free to swing back and forth.



Safety

The tools required are standard office scissors, ball point pen, rule and adhesive tape which should not cause any safety problems. The AA battery required must not be left in the battery holder when not in use.

When making keep workplace tidy and put cut off pieces in the bin or temporarily in a plastic bag.

Teachers need to carry out a safety assessment.

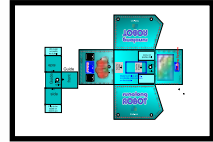
Runalong Robot Parts List



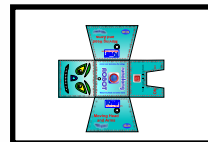
2 x Blue clip-connector (strip of 4)



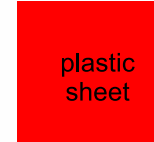
Cut up and used as single blocks



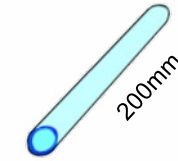
1 x Base (sheet)



1 x Head (sheet)



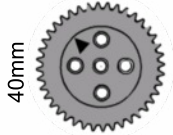
1 x cutting sheet



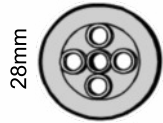
1 x Light Blue tubes 5mm dia (4mmID)



Plastic Bag



4 x wheel



3 x wheel, pulley or offset cam



1 x 20T gear or pulley (2 needed)



3 x 4mm dia 'SNAP rod' "push fit" into wheels etc



4 x Grey rubber collars to fit on grey tubes



6 x Blue Collars for use with 5mm tubes and rods

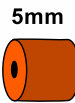
MOTOR PARTS



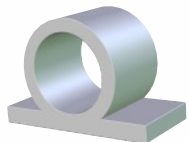
1 x AA battery holder with switch



1 x Long lasting pulley rubber band



1 x 5mm dia. orange tube about 5mm long



1 x Electric ~motor holder



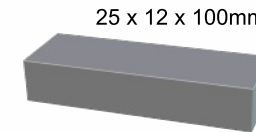
1 x Electric ~motor fast



4 x adhesive pads



5 x eyelets 4mm hole (silver color)



1 x foam block



2 x eyelets 5mm hole (brass color)

Go to www.kre8.com for free .pdf instructions

Tools



ball point pen



rule (preferable metal)



good scissors



Hole punch



Wire strippers



Clear tape on dispenser

Also cutting boards and AA battery

Robot Base - Step-by-Step Instructions



With tools handy you can start. **Scissors, hole punch, rule, ball point pen and clear tape.**



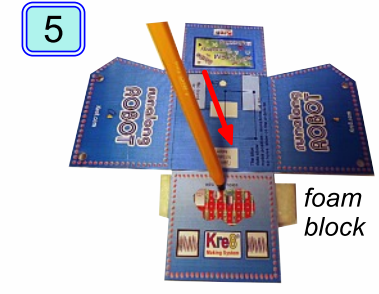
Roughly cut out the robot base outline then go to next step.....



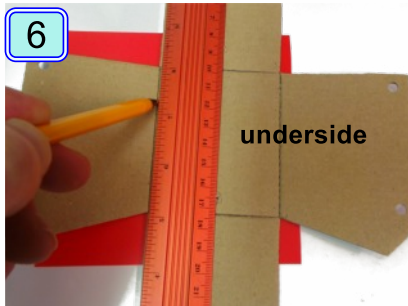
....Remove more **surplus SuperSheet** so **final cut** is easy and **accurate** to cut.



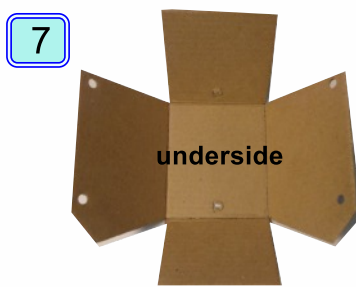
Punch the four holes for the wheels using an **office paper punch**.



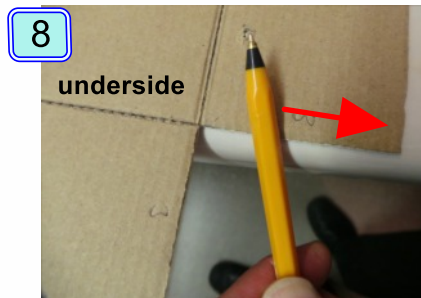
Punch the other two holes using **ball point pen** with **foam block** under the **SuperSheet**.



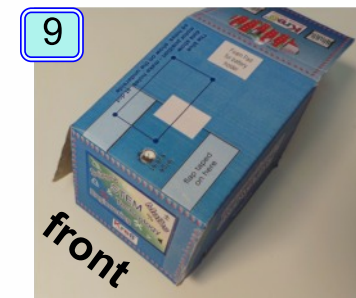
Score the four fold lines. MUST be done on the underside. Using **rule** and **ball point pen**. (Use **cutting sheet** to protect table)



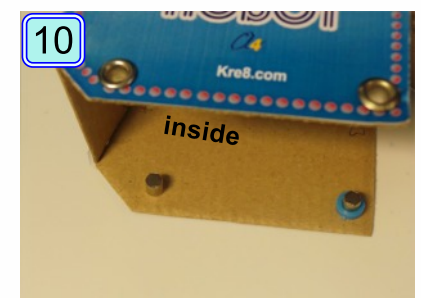
Fold up the see how it looks then mark the **four meeting corners**.



Optional - to make the neatest corners **bevel the edges** to be **taped** by sliding **pen** along at **45 degrees**.



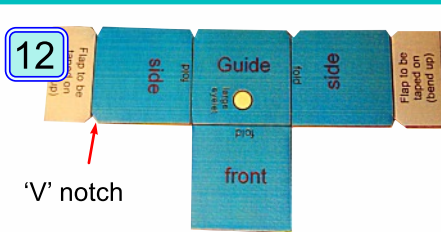
Tape the front two corners only. Use about **40mm** length of **clear tape**. Leave back open for easy access.



Optional - Add 4 **small eyelets** in the wheel axle **holes** and then hold in place with **blue collar**.

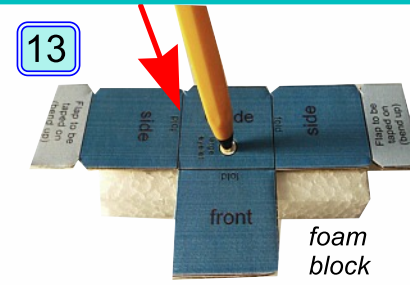


Add another **eyelet** in the **top** as shown. This is needed to ensure hole kept open

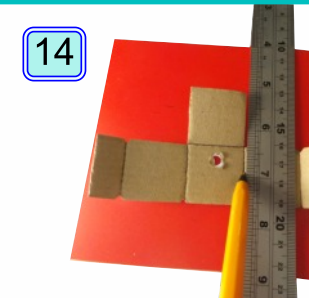


GUIDE PART

Cut out the **guide part** including the small **'V' notches**.



Poke hole in **guide part** using a **ball point pen** with **foam block** underneath.



Score 5 lines on **underside** ready to **fold up** (Use **cutting sheet** to protect table)



Tape front corners of **guide box** (Leave **side flaps** as shown)

16



Tape **guide part** on by place **tape** right over **tabs**.

17

Use **8cm snap rod**



offset wheel to make cam

push and twist cam on

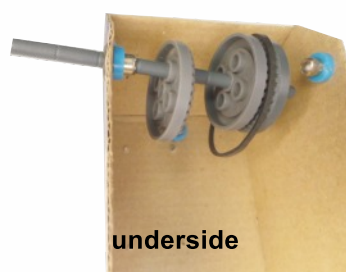
Snap the **4mm snap grey rod** to make it **8cm long** then slide **28mm cam wheel** on - **must use offset hole** as shown.

18



Make **pulley** by adding two more **28mm wheels** face to face as shown. Place **16mm** from end.

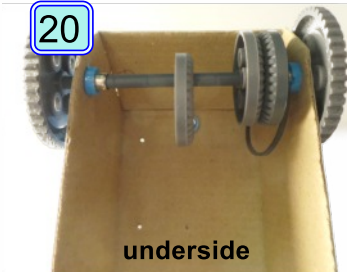
19



underside

Add **rubber band** then **slide** into front **axle holes**.

20



underside

Add the large **40mm front wheels**.

21

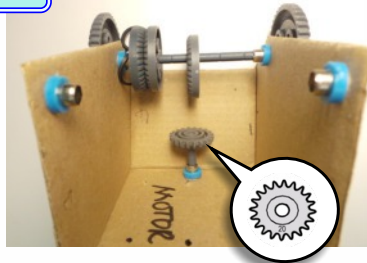


14cm long snap rod used

'Snap off' rod to make it **14cm** long then place it through the **guide part**.

22

underside view



Add the **cam follower** to the end of the **snap rod**.

23



Test the **cam action** works by **pushing** the robot along. The **snap rod** will move **up and down**.

24



35mm from top

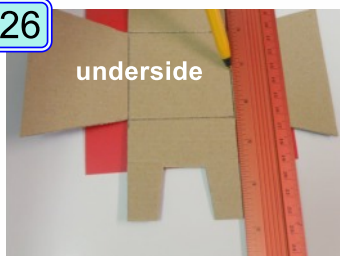
Add **grey collar** **35mm** from top of **guide part** - when **cam** is in 'up' position.

25



Cut out neatly the **robot head**. Start with a **rough outline** first to make it easier.

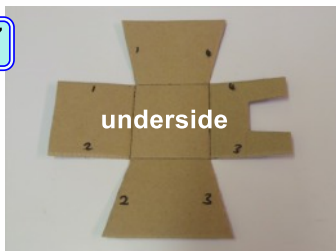
26



underside

Score the four **fold lines** to make the **robot head**.

27



underside

Optional - Bevel the edges at **45 degrees** to make **neatest joints**.

28



Make **arm holes** and the **top hole** using **ball point pen**. (with **foam block** underneath)

29



Optional - Push two large **eyelets** in the **arm holes** (no **collars** for this).

30



Tape robot head corners then place on **robot base** while you make the **arms**.

31 Arms

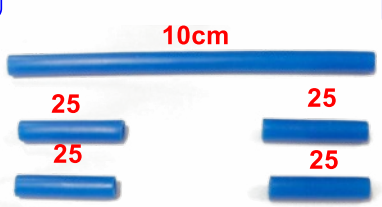
You need 5mm light blue dia tube



2 x Clip connectors

Make **swinging arms** by getting these three parts then.....

32



10cm

25


25

25

25

.....cut using **scissors** the **5mm light blue tube** to make the **sizes** shown above.

33



Note
assembly is easier if rods ends are cut at an angle

Assemble **arms** using the short **lengths** and **blue clip connector blocks**. (cut 6 blocks off the clip connector)

34



Complete **arm assembly** then add to the **robot head** next...

35



Moving Head and Arms

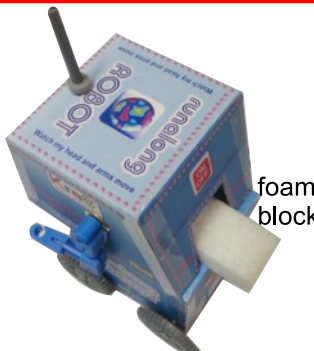
Rapid

Add **swinging arms** to the robot head.

36 Decision Time

If you have enough time left you can add the **electrics** and go to **(39)** If you decide to **stop now** you need to add the **foam block** as shown on the right hand side to keep the **robot head** in the correct position. Fix **foam block** using two of the adhesive foam pads.

37



foam block

ONLY if stopping now do you need to add the **foam block** as shown above.

38




Ready to test

39

Adding the ELECTRICS

40

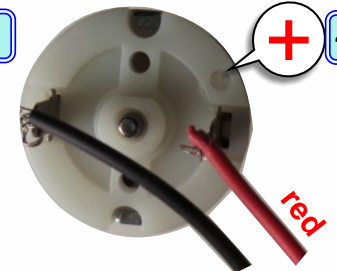


wire strippers

15mm

Strip the ends of the **battery holder wires** leaving **15mm** bare wire.

41




+

red

Connect the **red wire** to the motor marked **'+'** and **black** to the other.

42



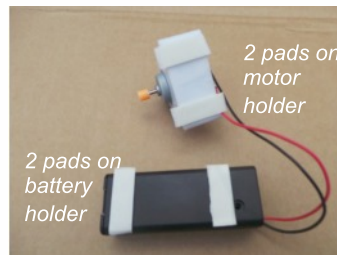
After adding wires **push** the **orange tube** onto the end of the **motor spindle**.

43



Place **AA battery** inside the **holder** and **test motor** it works then place motor in **holder**.

44




2 pads on motor holder

2 pads on battery holder

Place **adhesive foam pads** on **battery holder** - the opposite side to switch.

45



switch on top

Attach **battery holder** on the **robot base** so about **10mm** hangs over the **end**.

Final Steps - Step-by-Step Instructions

46



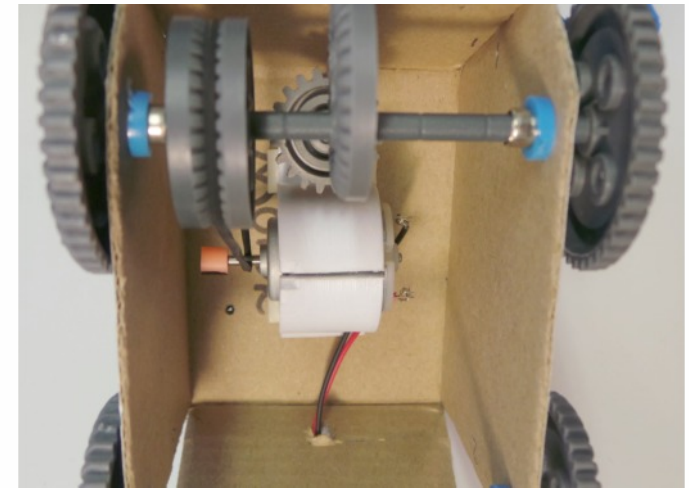
TIP to avoid undoing the wires you can cut to the wire hole then tape it up after adding.

47

Attach **motor** to the **underside** of the robot base. Place motor in centre

Testing - Rotate the front wheels and if pulley is in-line it will stay on. Adjust if necessary

Then add rubber **drive belt** from motor to drive pulley.



48



Turn motor on watch it go check the head moves up and down.

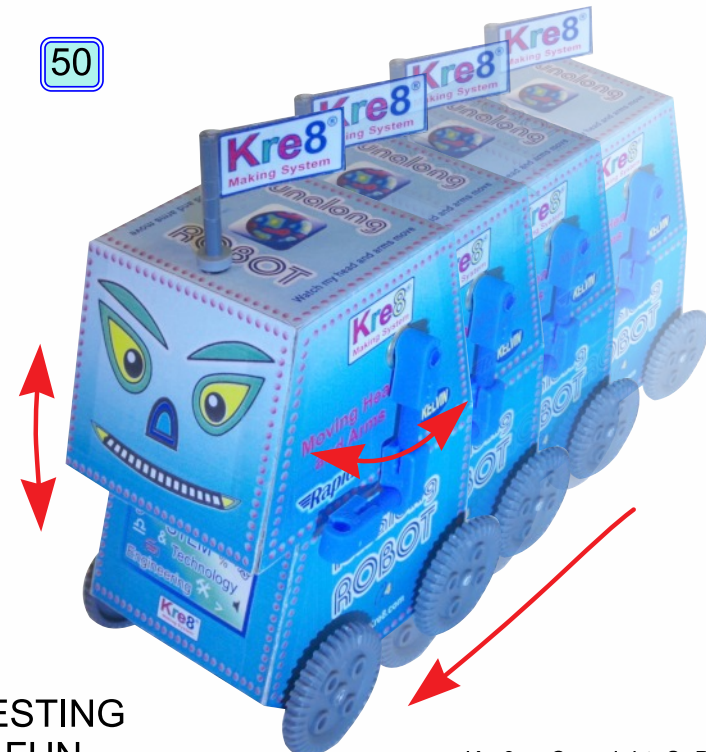
49



Optional - add flag. Note - cut flag shape then remove the thick backing before folding in half. Then tape.



50



TESTING FUN