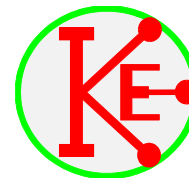


## 26 Buggy 2.



### EQUIPMENT

- 1 x completed buggy from Buggy 1
- 1 x AA cell holder with flying leads (cut to 9cm long including 1cm bared and tinned end)
- 1 x AA cell
- 1 x small electric motor (1.5 - 3V) with (short) wires soldered onto the terminals, ends bared and tinned
- 1 x switch with (short) wires soldered onto the terminals, ends bared and tinned.
- 1 x motor holder including any spacers needed to hold the motor.

### RISKS

Splinters from wood on the chassis and wheels.

Smooth off wood as much as possible.

Warn students of dangers of rubbing their fingers against the wood.

Injuries from rubber bands breaking or being released from the buggy.

Advise students of these dangers.

Battery explosion from being short circuited.

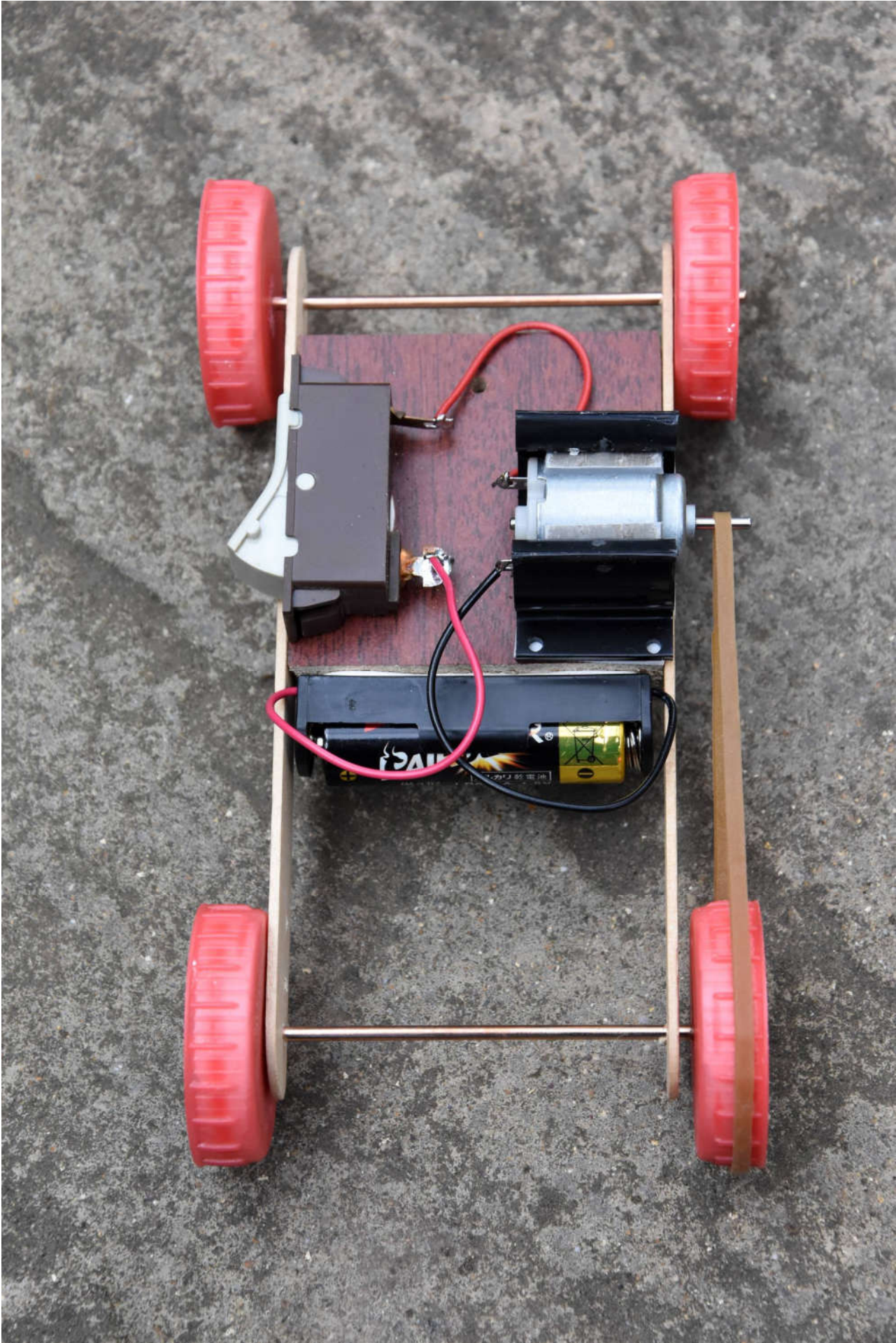
Supply cheap non-alkaline batteries if possible.

Warn students of the dangers of short circuiting the cell.

Advise students to call for assistance if the cell even becomes warm.

### SESSION

- 1). Soldering demonstration.  
Discuss risks and dangers.
- 2). Students consider what is electricity.  
Students consider what is "voltage".  
Students consider what is "current".
- 3). Students fit the AA cell into the cell holder.
- 4). Students test their motor by touching the cell leads onto the motor terminals.  
Students investigate swapping the connections to the motor.
- 5). Students fix the motor holder to the buggy.  
Students fix the motor to the holder using any necessary spacers.
- 6). Students attach the AA cell holder and switch to their buggy with Blu-tac.
- 7). Students wire up their buggy.  
Black cell wire to one motor terminal.  
Red cell wire to one switch terminal.  
One end of red wire to the other switch terminal.  
Other end of red wire to the other motor terminal
- 8). Students put rubber band around motor armature and wheel.  
If the band comes off the end of the armature, twist motor holder slightly anticlockwise.  
If the band comes off the inner side of the wheel, twist motor holder slightly clockwise.  
If buggy moves 'backwards', students swap connections to motor.
- 9). Students test buggy and try the bird's egg challenge.
- 10). Selected students solder wire connections.  
See end for Risk Assessment for Soldering.



## Soldering Risk Assessment

| Hazard               | At risk   | Control Measures   | Risk rating |
|----------------------|-----------|--|-------------|
| <b>Poisoning</b>     | Users     | Use Lead free solder.<br>Avoid breathing in the vapours from the flux.<br>Limit exposure to soldering flux.<br>Use air extractor if there is to be much exposure.<br>Wash hands after use.   | Low         |
| <b>Burns</b>         | Users     | Users to concentrate on what they are doing and not be distracted.<br>Avoid contact with hot end of soldering iron.<br>Use pliers/tweezers to hold any wires/components being soldered.<br>Allow soldered items to cool before touching (10s rule).<br>Keep soldering iron in stand when not being held.<br>Switch off and move to a safe place when not in use.<br>Any minor burns to be cooled under a cold tap. (Non-blistered)<br>Any blistered burns to be cooled, then covered with sterile material and consult medical expert. | Medium      |
| <b>Fires</b>         | Materials | All soldering to be carried out on heat resistant mats.  | Low         |
| <b>Eye damage</b>    | Users     | Wear goggles/safety glasses.<br>Waste solder to be wiped from soldering iron on damp sponge on the soldering stand and not 'flicked' from soldering iron.  | Low         |
| <b>Electrocution</b> | Users     | Inspect soldering iron cable before use - do not use if damaged.<br>Ensure soldering iron does not damage the mains cable.   | Low         |