

YE Policies and Procedures



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Program Overview

Levels of the program

We have 4 levels of the program:

1) Big Builders (BB) - This is run for 4 year kindy and Preps in some schools. We use K'nex as the building material. The focus of the teaching is Science topics. Children learn to follow instructions, fine motor skills and problem solving skills during the session. Please see - <https://melbsouth.young-engineers.com.au/big-builders/>

2) Bricks Challenge (BC) - This is run for mainly Year 1s. There may be some Preps or even some Year 2s in the group depending on the school. We use Lego as the building material. The focus of the teaching is Physics and mechanical topics. Children learn problem solving skills, physics and mechanics terms in a hands on fashion Please see - <https://melbsouth.young-engineers.com.au/bricks-challenge/>

3) Robobricks (RB) - This is run for mainly Year 2s and 3s. There may be some Year 4s in the group depending on the school. We use Lego as the building material. Children learn problem software engineering, user design, algorithms and flow charts. The models are some what complex and use Lego Wedo hubs. Children build the model then code it.

Please see - <https://melbsouth.young-engineers.com.au/robo-bricks/>

4) Advanced Robotics (ARB) This is run for mainly Year 5s and 6s. There may be some Year 4s in the group depending on the school. We use Lego as the building material. Children learn problem solving, software engineering, user design, algorithms and flow charts. The models are very complicated and use Lego Ev3 Mindstorm engines. Children build the model then code it.

Please see - <https://melbsouth.young-engineers.com.au/robotics/>

We have 3 types of classes:

Types of classes

1. 2 Instructor classes - In this type of class number of children is between 16-18. 1 instructor is Rb and 1 is BC. If the BC group is small and there are a few BB kids , 1 instructor may teach both BC and BB. Similarly 1 instructor may teach both RB and ARB.
2. 3 instructor classes - In this type of class the number of children is between 20-26. 1 instructor is BC, 1 instructor is RB and 1 instructor is TI (third instructor - helping both groups). The TI may have their own BB or ARB group as well.
3. 4 instructor classes - In this type of class the number of children is 26 - 32. There may be 2 BC and 2 RB instructors. Or there may be 2 RB 1 BC and 1 ARB instructor - depending on the number of children in each group

3 Golden rules

These 3 rules are essential to manage the class smoothly. They are applicable to all class formats. The rules are:

1. Colour does not matter - length does.
2. Getting every step checked.
3. Stop building when you are asked to.

1. Colour does not matter - Length does. This rule has to be explained in great detail during the first week - especially for BC and RB groups. You can build the first step as a group during the introduction if needed. Show them how to find few of the pieces and especially important - show them how to measure the rod length. (Look at the blue number then match it with the studs against a brick)

Important - For BB groups colour does matter as instructions are colour coded correctly. So this rule is not applicable for BB groups. However you would still explain how to build by mentioning how flowers and sticks connect to each other. (and how to count the spacing between petals)

2. Get every step checked - It is VERY IMPORTANT that this rule is enforced from the start. As the term progresses the models increase in complexity. A good step checking culture makes it much easier to manage the harder models later on. There are 3 ways to enforce step checking on children:

1. If you are a single instructor and your group is small - (3 models - 6kids or less) - Get the children to sit around 1 large table. Ask them to raise their hands when they finish a step. Check it. Give positive re-inforcement for every step checked - Well done! You are getting there! Can you fix this part etc. (Seperate section under lesson delivery explains this in great detail.

3 Golden rules

2. If you are a single instructor and your group is large - (4 - 6 models - 8-12 kids) - Get the children to sit around 2 tables. Set up your step checking station between the tables. Keep motors, sensors, rubber bands etc close to you. Ask children to come up to you to get the steps checked. You can have weak builders sitting close to you and keep helping them in parallel or between step checks, You can even write all the kids names on the board (or paper) and check mark for each step. This way you can quickly track their progress. During the build you can mostly be at the station and occasionally do quick walks around the class keeping an eye on quieter ones and making sure everyone is step checking.

Method 2 is the best one as it encourages children to take action when they are stuck and not wait passively for help. It can be done in smaller groups too.

3.If 2 instructors are managing the same group (8-12 models - 16+ kids) - Divide the group into 2 smaller groups during the build phase of the lesson. For e.g if the children are sitting around 4 tables, each instructor manages 2 tables. Each instructor enforces step checking for his own sub group of kids.

Step checking is also a crucial way to give positive encouragement to each child. If every child or pair gets 1 positive high five, well - done etc - for every step - they get to make at least 8-10 positive one-on-one contacts with you during the session. Such positive attention prevents the child from seeking negative attention from the adult, is very motivating for them and helps you give the input each child needs according to their ability. It is the best way to make your work easy and help children love the class more!

Step checking is especially important for RB and ARB - as models are quite complex and will not work if not built correctly. Older children need positive encouragement too!

Class phases

3. Stop when you are asked to - Transitioning children from building to listening or packing can be tricky. This rule sets expectations from the start. You can have your own transition routines to support this. Example clap hands, ring bell, ask children individually to stop etc. See behaviour section for more details around this.

You **MUST REPEAT** the rules at the start of **EVERY LESSON YOU RUN**. After week 1, ask the children to tell them. For RB and ARB, the rules can be written on the board.

After repeating the rules, proceed to hand out hand sanitisers to the group before you hand out instruction sheets, Lego or ipads

A phase is what children are doing. Broadly our session have:

- 1) Listen phase - Children are sitting on the floor, away from the Lego, and listening, discussing or answering questions.
- 2) Build phase - Children are on the tables working on their Lego/Knex
- 3) Packing phase - Children are packing away the Lego/Knex

BB and BC groups follow the Listen, Build, Listen, Build, pack format.

RB and ARB groups follow the Build, Listen, Build, pack format.

The above is mainly done to ensure to only 1 teacher is speaking in multi group classes. This is because in most schools we have multiple groups in the same room and we have only 1 white board for teaching. When sharing the space with another group please make sure that the other group is in Build phase before your group goes into Listen phase. 2 teachers talking different things at the same time can be very distracting for students.

Teaching different groups

Teaching BC Groups

- BC session structure is **Introduction, Build, Review, Extend**.
- The first 5 minutes sets the mood of your entire lesson. If this is good – kids are sufficiently excited and motivated – the lesson will go well.
- Always repeat golden rules before build begins
- Enforce step checking culture.
- When 50% of the models finish completion get children back on the floor for review. During the review – drill the concepts. Ask each child about what they learned, what the technical terms mean, where is something happening. Do it like a rapid fire question round to keep kids engaged.
- When kids go back, give design challenges to those who have completed. Help those who have not finished to reach completion. Remember to give less attention to finished models – advanced builders often tend to demand the most attention from instructors.
- Battery boxes are given only at last 10 minutes – before pack up. This is also when lego people etc are handed out. The battery pack should feel like a prize to the child
- Initiate pack up by taking away batteries. Again this becomes part of class culture so you are not forcing kids to pack. The bell can be used also.
- During pack up - get children to focus on putting away the Lego. You can walk around the room motivating them, collecting the instruction sheets, motors etc. or helping weaker ones. Don't get so distracted while packing that you don't notice a child running out of the room. As children finish packing get them to sit near their bags. The main focus should always be the kids
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Time in brackets is the time when the particular activity finishes. All our classes start either at 3:15 or 3:30. Attendance is taken and name tags are handed out before the intro begins.

BC group time management

Time in brackets is the time when the particular activity finishes. All our classes start either at 3:15 or 3:30. Attendance is taken and name tags are handed out before the intro begins.

15 minutes - Collecting children, attendance, children eat (3:30/3:45)

10 minutes - Intro + start build (3:40/3:55)

30 minutes - Build (4:10/4:25)

5 minutes - Review (4:15/4:30)

10 minutes - Extension (4:25/4:40)

10 minutes - Battery+Lego play (4:35/4:50)

10 minutes pack up (4:45/5:00)

Time management is crucial for lesson success. The above schedule is for an average model, it needs to be adjusted slightly depending on the class. For example, a generally weak group may take 35 minutes to build and 5 minutes for 1 extension. A generally strong group may take 20 minutes to build and do more extensions for 15 minutes. They can also get a longer play period of 15 minutes. In case of longer play, you need to come up with ideas to ensure kids are interacting with the model sensibly - racing competition, shooting a target together as a group and so on. Otherwise children will quickly start damaging motors by creating their own drills and beyblades.

BC - Doing a good introduction

- Write model name on board in large letters - Get children to repeat model name 3 times at the start and 3 times during revision.
- Focus on preps and year1s. Make sure they are actually listening and understanding.
- Give context of the model before you launch into the story or anything else. Each BC lesson should begin with:

We are building a xyz model today. Can everyone repeat that? What does this do? Where have you seen it?

If some child answers appreciate the child then REPEAT the answer yourself for the other kids.Kids don't pick up answers given by other kids.

- When explaining technical concepts start with what the children know. So if you are explaining belt transmission talk about transmission as sharing or passing things to one another. Really breaking down concepts to the simplest level.
- Continuously ask questions. Rule of thumb is that every 2-3 sentences you speak there should be a question.
- Get children to repeat key terms as a group. Get them to answer yes or no questions as a group.

Make sure your intros are interactive and engaging. Use children's names as much as possible when speaking to them.

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BC role - running a good revision

- Always start the revision by What did we build today? Get kids to repeat the model name as a group, ask few times to different kids.
- Plan on asking 2 or max 3 questions during revision. Ask at least 5 children the same question.
- You should get tired of repeating yourself... that's the only way that kids learn. Especially for large BC classes.. I noticed that only 2-4 children are understanding and participating everyone else is spaced out.
- You can allot 2 or 3 kids whose model you will use for revision. So say in advance, We will use Jimmy's model for revision etc...that will help kids motivated for revision.
- **Important: Kids should not have any models in their hands during revision. They will get very distracted if they have models in their hands**
- **Ensure each child is involved. For large groups 2 instructors can divide them up and run revision in 2 groups of 12. Each group sits at either end of the room, with a different instructor and talks about what they have built and how it works.**

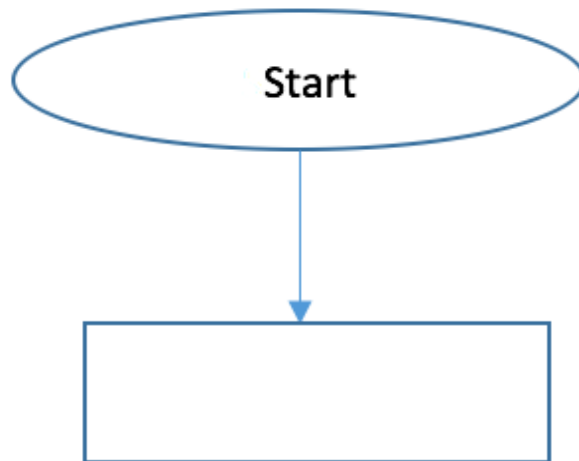
Running RB groups

- RB session structure is **Build, Listen, Code & Extensions**.
- You will write the model name, model code and 3 golden rules on the board at the start. Session starts by handing out hand sanitisers. Children will start building straight away.
- The model code is found by going into the teacher mode of the tablet. The code given in the lesson plan may NOT be accurate as codes keep changing in the app.
- Then hand out tablets and Lego kits. Remember you cannot address the whole group loudly at this time as BC instructor will be doing intro in the same room. You can speak to individual pairs in whispers.
- As kids start building you can explain few things like axle measurement on the go. **Remember to enforce step checking consistently.** Kids are expected to come up to you to get every step checked. You have to be 'in and out' so sometimes you are roaming around the class keeping kids moving on and sometimes you are at the checking station checking steps. Mostly you will walk around more towards the start and end of the build phase. As advanced builders finish , you will need to give them RB build extensions at this point to keep them engaged.
- Once 50% models have been completed you will call the kids to the floor for explanation.

RB Explanation

- During your RB listen phase, you will explain 7 steps of software engineering. These steps are:
 - 1. Build
 - 2. Use, purpose, machine mechanics (Why the machine was built?)
 - 3. Programming objectives (What are machine functions?)
 - 4. Algorithm (How to achieve function?)
 - 5 Pseudocode (How to translate English to code)
 - 6 Coding
 - 7. Testing
- Overall, the goal of the RB instructor is to ensure children know the 7 steps and can do them themselves by the end of the term.
- You will begin by telling kids that they have finished the 1st step – the build. Then discuss the use & purpose of the machine. Get kids to answer questions like who is using the machine and why are they using it. You will also explain machine mechanics so they understand, mechanically, what happens when the motor spins.
- Step 2 leads to step 3 – What do we want to code? Identify coding goals. Initially kids will be clueless or might suggest unrealistic things like make a super fast conveyor belt. Remind kids that we are discussing coding goals based on what the motors and sensors do when they are turned on.
- Step 3 leads to Step 4 – The algorithm. When teaching the algorithm, you will draw the flow chart on the board. You will start with drawing this on the board:

RB explanation



Then ask kids what happens at the beginning. When the machine is turned on what should it do? Does it beep, flash lights, display a message? Add that to the rectangle.

Continue in this way, adding rectangles and arrows – getting children to think as a group, during the discussion about what the machine does. You can refer to your lesson plan while teaching this – but the more properly you absorb it – the easier it is to teach.

RB Explanation

- Once the algorithm is on the board, you will write out the pseudocode. Usually, for the first week – you will need to explain what a pseudocode is and how the children have to look up the pseudocode sheets to code. But after the first couple weeks, you can write the pseudocode straight away. I don't usually explain the pseudocode again – as they should have understood the steps in the algorithm. While I write the pseudocode, I get those kids still building to finish building. Kids who have finished building can get their tablets, sit near the board and start coding. Usually, kids take time to look up the symbols etc in which time you can finish writing out the pseudocode.
- Then kids will come up to you and get the code checked. Only AFTER you have checked you will hand out the hubs. DO NOT hand out hubs in the beginning, even if the building instruction requires the hub. Just tell the kids that they will get it at the end. Again this is part of class culture. The hub must be earned.
- Once kids start coding and get the basic model working, start giving them coding extensions or other mechanical extensions that affect machine operation. The more you can challenge them and get them to problem solve – the more they will enjoy this stage. Lego people also given at this time.
- Initiate pack up by taking away hubs. Again this becomes part of class culture so you are not forcing kids to pack. The bell can be used also. While kids start packing you will collect tablets, hubs, motors, rubber bands etc. from your group.
- Children should be asked to sit near their bags and eat a snack or wait in an orderly fashion for parent pick up. This time of the session is crucial – if children are running amok it leaves a bad impression on parents.

RB time management

Time in brackets is the time when the particular activity finishes. All our classes start either at 3:15 or 3:30.

15 minutes - Collect children, attendance, children have snacks (3:30/3:45)

30 minutes - Build (4:00/4:15)

15 minutes - Explanation (4:15/4:30)

10 minutes - Coding (4:25/4:40)

10 minutes - Extension+Lego play (4:35/4:50)

10 minutes pack up (4:45/5:00)

Time management is crucial for lesson success. The above schedule is for an average model, it needs to be adjusted slightly depending on the class. For example, a generally weak group may take 40 minutes to build and 10 minutes for coding. A generally strong group may take 20 minutes to build and do more extensions. They can also get a longer play period of 15 minutes. In case of longer play, you need to come up with ideas to ensure kids are interacting with the model sensibly - racing competition, shooting a target together as a group and so on. Otherwise children will quickly start damaging motors by creating their own drills and beyblades.

Running groups as TI

- The below points are useful when you are the third instructor and don't have a specific group of your own.
- Hand out hand sanitiser, Lego people at the right time
- You will be the one running around finding missing children, retrieving any children who are spending too long in the toilet, going outside to get some equipment, or find someone etc as and when the situation arises.
- Focus your attention on the group in the Listen phase. When the teacher is talking make sure the children are actually listening. Be on top of negative behaviour. Once listening group has settled in switch to build group
- During the listen phase you can stop children from talking to each other, interrupting the teacher and redirect their attention to the teacher. If a child is too disruptive, you can pull them away from the main group and have a word with them, so lesson continues undisturbed for other kids.
- Help the weak builders. Some children require a lot of attention in decoding the steps. So you assist them, without building for them. Tell them which bits to join, where are the parts, etc.
- As the lesson progresses, your focus shifts to RB group. Help weak ones complete the model (after explanation) as RB teacher will be helping the weaker ones code.
- Identify disengaged/distracted kids and get them on track.
- You will never CHECK the steps. Even if you know it is right, you will always send the kid to BC or RB for step checking. This is to enforce class culture of step checking.
- Once packing starts, you will collect all the motors, batteries, rubber bands, lego people etc. You can help both BC and RB for this.
- As children finish packing you will continue to check Lego trays and stack them, fill boxes etc.

Running BB and ARB groups

BB sessions are same format as BC sessions and same tips and strategies apply. Only difference is the introduction needs to be done more simply. Start from what the children know - Asking lots of questions at the start - Usually (Have you seen a <model name> Where? What was it doing? This will tell you what they know and then add to the knowledge bit by bit.

ARB sessions are same format as RB sessions and same tips and strategies apply.

Key differences:

- Children get 2 tablets at the start. Each partner builds a separate set of steps and then the whole model is joined at the end. Step division is to be given to the children so each child knows what he is supposed to do.
- Every tablet is paired with a specific EV3 hub. During coding the children are given the same hub number written on their tablet.
- There is no psuedocode. After explaining algorithm on board, children are given the coding sheet (different for each lesson) that shows them what they need to code.

Teaching best practices

Defining success

A lesson is successful if:

- Every child has built the basic model. For some models this means reaching the last step. For other models, (which have white and red stages) it means completing the white stages.
- We want children to reach the final stage where they turn on the battery and the model works!
- Most children have picked up most of the concepts introduced. Every child knows at least one key term and can explain in their own words
- Every child is challenged and feels successful.
- No child is disengaged, frustrated or crying at the end of the lesson. This may happen in the middle of the session but at least not at the end.
- Every child **knows the name of the model** they built at the end of the session. This is absolutely important!
- For RB and ARB sessions, every child knows how the code is affecting machine function. Some children should be able to change code to alter machine function

Your success is our success. We want our instructors to feel satisfied and proud of their sessions. You are playing an important role in helping your student prepare for a world that is rapidly changing due to technology. Young Engineers is all about enabling children to problem-solve and develop resilience and this is possible only if the instructors model the same. We want you to look at each challenge as yet another problem to solve and focus on delivering better lessons, every time. Learn from your mistakes, don't be discouraged and keep working towards improvement. Follow this and encourage your students to do the same!

Remember FAIL – is only a First Attempt In Learning.

We want every instructor to advance in their teaching ability so that they can manage 12 children (6 models) successfully. At a minimal we expect instructors to manage up to 8 kids comfortably.

What is a successful lesson?

We want you to give 100% to your lessons – we want you to run sessions where children get so excited, they rave about it – they talk about it all week, they tell all their friends, they come back wanting to learn more. This happens when children finish building and get their basic model to work and then when they make that model ‘their own’ – adding design changes, extensions, solving problems and playing with the model according to their own imagination.

- Capture their imagination.
- Use discussion
- Repeat yourself
- Be loud and assertive
- Active child participation
- Explain things as mentioned in the lesson plan in an interesting and engaging manner.
- Asking lots of questions
- Asking whole group questions – Yes/No/Confused
- Being excited, energetic and enthused.
- You shouldn't be standing idle at any time. Keep talking to kids, asking questions, switching between kids.
- Keep using the model name during the build.. "Have you finished step 1 of the conveyor belt?" "Are you putting things on the conveyor belt.."etc.
- Pay attention to pair dynamics.. if 1 kid is doing all the work insist that they stop and hand over to the other partner. Learning to wait and take turns, be patient with each other is part of the process.
- Keep asking questions to individual students - even during build "What are you building? Can you tell me what is belt transmission and so on".
- Towards the end switch attention to fast builders. Are they solving challenges or just sitting and playing?

Step checking tips - what to watch for?

Things to note when you look at the instructions:

- Beam lengths at each step
- Line and plate lengths at each step
- Spacing – how many stud lines between beams or other structures
- Orientation – horizontal or vertical and pieces relative to each other. See what goes in the middle and which piece is where. The more you observe this the faster you will identify mistakes in the children's building.
- New additions at each step. Some steps have very subtle additions which can be easily missed.
- Nail positions and connections
- Axle positions at each step.

The more you know about each step, the better you will get at identifying children's mistakes.

Organizing yourself:

Different step checking strategies have been outlined in the Golden rules section. The following points outline what to do with each individual child

- It's about doing the bare minimum so the child can continue building THEMSELVES. This varies from situation to situation and comes with practice.
- We really aim to inspire from within. Enable the child to solve their own problems or at least to know the solution when they face the same problem next time. For e.g. if the child uses a wrong axle length, instead of just giving them the right one, show them how to measure the length by keeping it next to a brick. The more you do this, the better children will become at building.
- Do spend a few seconds checking the details though. Children make subtle mistakes – easy to miss.
- You can pre-emptively prevent mistakes by telling children one-on-one the details of the next step. "Don't forget this bit" or "Watch out for this bit".

Missing Lego

- If children are crowding around asking for attention – ask some of them to do another independent step (Say Step 5 which requires building new pieces) - that takes some pressure of you.
- If a child is rushing ahead, stop him and ask him to show you the steps. Get him/her to stop building and check the steps done so far. There will be mistakes.
- Any new children (who join in week 2 or 3) will need more help. Spend extra few minutes with them in the beginning explaining to them axle lengths and counting etc. as you build the first step with them.

If children ask for missing parts: (they claim to have insufficient Lego to complete the model)

- 99% of time children have miscounted and finished off parts by using them wrongly in a previous step. Check and get them to fix their model.
- The remaining 0.9% they have – either placed parts here and there on the table (its fallen down or under their hands) or a neighbouring child built from their kit by mistake. Ask them to search or use neighbour's parts.
- If above 2 are exhausted and there is a genuine missing part – open a spare kit and give parts from there.
- Open the spare parts box only as a last resort. It will add to your workload unnecessarily.

If the model doesn't work

- First and foremost, check for gear alignment and motor position. 90% of the time making slight adjustment to motor position, motor axle, gear contact or other transmission mechanism will fix the issue. Simply readjusting the gears and pulleys on their axles, or pressing down the beams etc. will fix the problem and get the model running.
- If you have been checking carefully all previous steps during the session and the model looks right – the problem would only be in the last or second to last step. Focus on that.
- Check nail positioning.
- Check relative positioning of major components.
- Check for missing parts or portions.
- You can narrate the problem-solving process – so children learn this as well. “Let’s check this.” Or “Can we try this?” Or “This isn’t working so the error is probably here.”

If motor/battery doesn't work:

- Check if the battery light turns on.
 - Check if the child has connected the 2 properly.
 - Connect the motor to another battery box. If the motor still doesn't work replace it. It has probably broken internally
 - If the motor worked with another battery box then the old battery box has probably run out of battery. Replace batteries straight away and dispose the old batteries in the nearest bin.
1. First thing to check is that they are connected to their own hub. Sometimes other tablets could be connected to the hub and nobody is aware of the situation. If in doubt turn off hub and reconnect
 2. Just turn on the motor and see if the machine works. (After the new upgrade the below code will require motor direction block added to the chain to get motor to spin)

RB models not working



1. If nothing happens it is most probably a mechanical issue. Do a quick check to see if the motor hasn't gone bad and hub battery isn't dead. Then "Open up" the machine to observe the bits near the moving motor. Most of the time gear teeth are not intersecting or some moving parts are getting jammed by other Lego due to a build mistake.
2. If the hub flashes yellow and it the machines moves a little it could be
 1. Low hub battery. Check the hub battery. If even 1 bar is less – you can replace it. But if it is full it is not a hub issue
 2. Increase power to motor. Some models won't move unless the motor is power 7+. Also check direction of motor spin.
 3. If above 2 are not helping, go back to step 3 and open the machine.
3. If the machine moves – but is not functioning as expected – it is a logical error. Get kids to use display messages to observe code flow.



RB code not working

1. Then kids can observe themselves what the code is doing and which part is not working

Common software errors:

- 1. **Loops** – Kids did not initialize loop variables outside the loop. Extra bits of code in the loop, which should be outside the loop.
- 2. **Sensors** – Kids are using the incorrect sensor function. For e.g. Image A instead of Image B below. They might also be using the sensor itself incorrectly. Shaking it before you are supposed to causes it to detect motion or tilt at the wrong time and affects code.



- 1. **Code blocks not linked** together. They have dragged them on the screen, but the blocks are not touching each other because of incorrect placement. For e.g they have dragged it on top of another code block or they have not used a loop limiter and trying to link it to an infinite code loop.
- 2. **Subtle coding errors** – You might give a cursory glance through the code and miss subtle errors which are causing issues. For e.g. using: image A instead of image B

RB code not working



It is very easy to miss such errors when you are looking through lots of different code. Obviously it has a big impact on the function.

- 1. **Not enough wait time** - Sometimes the code is moving too fast for the machine to actually respond. For e.g.



The motor spins for just 1 second. This is not enough for model to complete movement. Model moves a little and code is already waiting for sensor. Kids are shaking the sensor anyway – sensor detects motion and motor stops. It appears that there is a problem and machine is not working. But simply increasing the wait time will solve the issue.

You can observe and fix this by observing which code block is flashing on the screen and what is happening when it flashes. Adding display blocks as suggested in step 5 helps also.

RB code not working

- **1. Incorrect initial state** – Many of our models must be in the correct initial physical state for the code to work. For e.g. surprise box must be closed or monkey should be physically away from banana, or balance the car should be horizontal or victory gate should be closed with tilt sensor at level and so on. This initial physical state has to be reset every time the kids turn on the code. If kids are saying it worked before – but then it stopped working – then this means that they are pressing the green start arrow willy-nilly without resetting the physical state.

Some more suggestion:

Child sitting blankly/ refusing to code:

If a child is sitting blankly and not engaging with the code – you need to break it down for them. Don't expect them to do the whole code. Just ask them to turn on the motor, change motor spin. Whatever little is needed to get the model to work. Then you can take them, step by step, through the rest of the code.

Child staring glassily at the board while you explain algo:

Clearly this child is not understanding algorithm etc. Simplify your explanation further. Ask the child – What is the machine? What do you want it to do? How will you get it to move. Just basics.

Encouraging independence:

Don't keep spoon feeding the code to the kids. Instead show them how to use the pseudo code chart. Start with simple motor functions. The goal is that by the end of the term kids can code themselves – even without algo or pseudocode explanation. Similarly, don't keep troubleshooting for kids. If the error is a simple one, ask them to figure it out themselves. Learning how to debug is an important software engineering skill.

ARB - Connecting the brick

Partner doing all the heavy lifting:

Watch out for kids who are happy to let their partner do all the work. Such kids get bored by week 3 and DON'T come back next term. Always get passive kids to partner together. If one kid never codes – get them to code something simple by themselves. This is the main reason why I don't want children working in 3s

ARB - Connecting to EV3 Brick:

1. Make sure you have a tablet labelled good for coding
2. Make sure your EV3 brick has the SAME number as on the tablet.
3. Make sure the user account is student account of the tablet.
4. Open programming app
5. Look at bottom right hand corner – it should say No EV3 brick. If it is connected to any other brick, tap it. It will go to hardware panel. Click blue disconnect button. Go back to programming screen.
6. Turn on your EV3 Brick
7. Click top right hand corner of your programming app
8. Click the blue connect button
9. Wait (Count to 10) let it show complete list of all available EV3s. Select your Ev3 ONLY. Wait (Count to twenty). It should connect and show your brick name on bottom right corner.

If connection failed: (You get an error message or it stays hung

ARB - connecting EV3 brick

1. Try pressing down hard on your Ev3 name once more. Some of the Ev3 coding tablets have screen covers and do not pick up a gentle tap. If it still doesn't work -
2. Turn off your tablet Bluetooth.
3. Go to your EV3 setting. Select Bluetooth. Uncheck mark all. Click the check box. Count to 5
4. Enter Bluetooth setting again. Checkmark blue tooth and visibility. DO NOT CHECKMARK ipad/ipod option. Click the checkbox. Count to 5.
5. Turn on tablet Bluetooth. Say done if message pops up.
6. Repeat steps 5-9 from above.

If ARB models dont work

1. Make sure the Ev3 is actually connected to the tablet. Click the down arrow (download) next to the play button on top right corner of the screen to make sure the latest version of the code has been downloaded to the brick. The brick makes a little noise to indicate it is ready.
2. Make sure the connector wires to the motors are connected properly. They need to be clicked in, sometimes the children may not have pushed them in hard enough.
3. Make sure the wires are inserted in the same ports on the brick as in the child's code. This is the most common error.
4. Check that the code blocks are properly linked together and touching each other in the code.
5. Check the bottom values on each code icon match the ones given on the sheet. Children may have put negative values as positive or vice versa – which can reverse model operation.
6. If the code is partially working, the issue could be mechanical or incorrect initial state. By Incorrect initial state I mean that the model needs to be set properly before pressing play. (E.g arm down, lever closed, certain distance away from the wall etc.)
7. If the issue is mechanical – it is usually gear alignment. Gears are loose so disconnect or do not re-connect properly. This is done by tightening gears on their axles – (push the gear in and push the bush at the back of the gear axle closer – so the mechanism is tightly fitted. Moving axles are the biggest problem in mechanical issues.

More tips for fast builders

- BC extensions are of 2 types - **cosmetic and mechanical**. You can come up with many cosmetic ideas easily yourself. For example, if it's a crane, build a box for the crane to lift, build a car, build some steps, build a cabin, build a driver's seat. Keep giving them the next idea, as soon as they come up to you with the finished one. Mechanical extensions can be given to advanced builders so they are busy changing the mechanics and observing effects on machine operation. This can be things like gear swapping, adding wheels to the model base and making it move, connecting 2 models together, adding extra moving parts and so on. Many suggestions are given in each lesson plan
- RB extensions are also of 2 types. Cosmetic extensions are given during the build phase to keep fast builders engaged. Often children have to 'undo' these to get the model to work. It can be anything from build a car, add a lid, add a hat to the robot, etc. Once the children have coded, you also give software extensions. These are coding changes that affect model behaviour. Adding lights and sounds at different parts of the operation, playing with motor speed and direction, modifying code loops, changing code sequence are some of these.
 - Give them modifications
 - Ask them to help other kids.
 - Ask them to add simple 'cosmetic' parts like a platform for ferris wheel, box for conveyor belt etc.
 - Keep them positively engaged so they don't get carried away making design changes that uses every part in the kit and wreck the motor.
 - Get them to help weaker groups or help you out if they like helping
 - **If your whole class is fast you can call the kids once more as a group and get some children to do show and tell. So this will be an additional listen phase - done just before pack up. At least 3 pairs can show their model and explain how it works. Then kids can pack up in last 5-7 minutes.**
- **Some more ideas for fast RB groups -**
 - Hand out papers and get each child to write out the algorithm before the explanation.
 - Get 2 or 3 pairs to show and present their extensions to the whole group.

More tips for slow builder

- Are they distracted by neighbours or friends? See if you can move them to a different table. Don't suggest – just lift their kit and move them. Usually warning them about this gets them to start focussing.
- Are they discouraged because a friend is building faster? Motivate them, ask friend to help them/ show them.
- Are they stuck at a particular step or too overwhelmed? Help them to focus on the current step – and just do 1 little bit at a time. Praise the progress done so far.
- Are they tired/hungry etc. Don't stress about it. Just encourage them to keep building whatever they can.
- If any child is not building, even though they can – motivate them, build a little, help them get unstuck and move them on.
- Point out what the child has accomplished so far to keep them motivated to build.

Supporting Gender differences in learning

It is important to be aware of differences between how boys and girls learn and supporting each gender adequately.

While we cannot stereotype, we have noticed these common differences between how boys and girls approach this class.

Boys: Our classes are very popular and dominated by boys. Most co-ed schools have 75-80%. In fact many can be 100% boys. Boys tend to have a lot more energy, prefer movement and love to jump into the build straight away. They also love mechanical extensions and have very less patience to listen to instructors. They are also not keen on packing up.

Dealing with boys:

Don't give them too much rope. Enforce behaviour limits and expectations from the start. If possible, Get them to move more for step checking. You can do that by setting your checking station bit far from where the children are building. Competition is a strong motivator for boys. You can keep them motivated by asking them to build faster, build stronger etc. Feeding their egos is a good idea too. Appreciate them for each little step and get them to high five for everything.

Girls:

It is not that girls cannot build, cannot engineer etc...but society unfortunately starts influencing girls to think in a certain way from when they are very young. If a girl is the only one in a mixed class of all boys - she is bound to feel discouraged. Also girls tend to be cautious and slow towards their building approach - especially in the first few weeks. But over time, girls can become very confident and really excel in the program.

Dealing with girls

- Give them extra support and encouragement in the beginning. Partner them with other girls as much as possible. If not, a mild mannered, more mature boy is a better partner as he will be more co-operative and patient. Try and use their imagination to engage with the program better. Girls can be encouraged to extend the build in a more story based fashion - driver's seat, stairs, house etc. Lego people play makes a bigger impact on the girl's experience of the class. Once they are engaging and comfortable in the class, you can show them how to do mechanical builds.

Last class of the term

Group Presentation:

Class structure is Build -> Present -> Pack

Build - Children pick a choice of 1 of 3 models. Encourage weaker kids to pick the easier model. Children build for 40 minutes. While they build, instructors walk around helping them where they are stuck. We can't implement step checking - but instructors divide up models between themselves and make sure each child finishes the build. Kids work in pairs as always. Each child should be able to answer two questions - What did you build? How does it work? As they build keep talking to them about this and make sure they know what to say about their model

Present - 15 minutes All children to sit in a group. Each child/pair will come up and present their model to the group. The aim is to ensure that each child is able to talk about their model, what it does and any engineering principles behind the model.

Pack - Last 5-10 minutes

Managing Student Behaviour

Your goal is to: (in order of priority)

Keep students safe.

Keep students happy.

Ensure students are learning

Behaviour management - What is expected

- It is important that instructors have good class control so the children remain focussed on their task. Children are **STRICTLY** not allowed to touch the other things in the room (if any) or do anything else other than build and work with the Lego. They are not allowed to climb on furniture, touch other students or teachers, leave the room for any reason other than going to the toilet, speak loudly, use bad language, interrupt the teacher speaking etc.
- Children are expected to maintain the same standards of behaviour after school in our class as they would during school hours. Children are allowed to speak while building, but they must use their 'inside voices' and speak softly.
- The first thing you need to do is SET behaviour expectations. **A pep talk on behaviour is to be given in the first week, right at the outset.**
Simply say that:
 - 1) We are sharing this space with the school and we have to treat it respect.
 - 2) All equipment that is being given to you (the children) is NOT yours. It belongs to Young Engineers and is used by many children throughout the week. All equipment is to be treated with respect.
 - 3) What does this mean? We cannot throw Lego around, we cannot damage the equipment, we cannot touch or throw anything else in the room (Ask questions to get children to think of what they cannot do)
 - 4) What can we do? Keep our listening ears on - listen to the teachers, build the model, get every step checked, follow rules, follow instructions.
 - 5) At the end, all Lego needs to be packed and put away - or you cannot go home
- After setting expectations, during the session focus on good behaviour. Appreciate the children by declaring to the group - X is listening well and getting steps checked, Y has reached step 3 and is not distracted, A and B are working well together etc.

Establishing Authority

How to establish your authority:

- Stay calm and avoid raising your voice. You are in charge, not the kids
- Correct negative behaviour with minimal interruption. A sharp "stop that <child name>", a sharp glance, or a firm hand raised sign - thats all that should be needed. This works only if you set behaviour expectations properly. Threats can be used occasionally as an I want sentence. E.g. " XYZ, I want you to put that Lego down and come and sit here with everybody. If I have to repeat myself, you will not get the battery hub."
- If you must raise your voice in an emergency situation – (kids fighting etc) - or if you have made a threat as above– it must be followed up with a **consequence chain** at the end of the lesson.
- Use a lot of hey buddy, high fives etc. Be encouraging but firm
- Offer choices that are acceptable to you. For e.g. – “You can sit in the corner and build by yourself OR you can sit here and build with this new stranger child. You cannot build with your friend.” (In a scenario where friends are distracting each other)
- Establish or point out consequences during the intro itself – 3 golden rules. If you don't get your steps checked and the model does not work at the end – We cannot help you. If you don't start packing up now, you will have to stay back after everyone leaves.
- Give clear instructions. Don't be ambiguous or unsure yourself. Take quick decisions and stick to the decision taken.
- For RB – children are expected to code. They cannot just build and keep exploring the build aspect only. If this is happening – even after week 3 – establish consequences to the child. Have a chat with them after class – say I've noticed you are not coding. You just want to build and explore the mechanics but coding is a new challenge. I am sure you can do it. Next week, we will try together. If I see that you are not coding, you will need to pack up earlier than everybody else.

Consequence Chain

Consequence chain:

When misbehaviour has happened during the lesson – leading to some kind of negative reaction by you or disruption to the class – follow it up by pulling the child aside at the end (during pack up) and going through the following steps:

E.g. 2 kids who are friends were mock-wrestling during intro and you had to yell at them. At the end of the class you pull the children aside and say (in a calm voice):

1. I noticed (Always use I sentences) that you have been fighting in the class. We cannot have this behaviour because (ask the child to give a reason then add to it) it disturbs everyone else.
2. Next time if I notice you fighting, you will not get to build together. You will have to build with some other child that I choose.
3. Can you repeat this for me – get the children to repeat it (If we fight in class next week, we cannot build together)
4. Also, you will need to remind the children of the expected behaviour and the consequence at the start of the next lesson as well.

Obviously if they repeat the behaviour, you have to follow through. But don't shame the child. Just say – You made a poor choice this week – so you won't get the battery box. You can watch your friends turn on their machines instead.

****It is important that you try and find a consequence that is related to the behaviour and age appropriate – not overly harsh.

Class culture:

What we want:

- Children are enthusiastic and excited to learn
- They know what they are building and how it works
- They follow routines like step checking, pack up etc.
- Instructors ask lots of questions which children are able to answer or willing to learn
- Each child is busy and positively engaged with their own model for the entire duration of the lesson.
- Children are being extended and supported based on their ability.
- They listen to and respect the instructors

How to establish this - Instructor attitude:

- Be firm but polite. You are the leader and the 'boss' of the session.
- Do not hesitate to be authoritative, loud and firm when addressing the whole group.
- Be cheerful and energetic. If you are excited about the model kids will be excited too!.
- **Feed the positive** - Keep appreciating the well behaved kids. If a misbehaving child follows instruction – heap praise on them. Don't keep giving attention to the negative and 'punishing' the good kids by ignoring them.
- Use games, songs and transition routines to keep the kids positives engaged.

Establishing culture

- Get routines and patterns established from week 1
- Establish signals – example a chant that children know indicates time to start
- Stress that only 1 person talks during group discussions. When you talk – they cannot interrupt. **DO NOT SPEAK UNTIL YOU HAVE THEIR 100% ATTENTION.**
- Use transition routines between build, listen and pack. See further for details
- **Games are a powerful tool to connect with kids - especially at the start of the lesson. See below for ideas.**
- Ensure that children don't have any models in their hands during discussion. All tablets must be placed face down on the floor.
- Start pack up early or on time. Enforce that children cannot leave unless they finishing packing up their tray. You can let parents know as well. If a child leaves early without packing – make note and next week make them start pack up early.
- Best way to start pack up is to take away the battery boxes and motors.
- Reward positive behaviour – children who pack up early to be appreciated, given extra rewards, can give them extra responsibility in helping you. Find what motivates that particular child
- Second instructors to put in extra effort towards maintaining class culture – correct misbehaviour right away, ask lots of questions, keep track of any consequences over couple weeks and so on.
- In most cases, misbehaviour is prevented if children are positively engaged. Get children to help each other, hand out parts (like battery motor etc), give design challenges, ask them to count something, etc. Give the child a small task to do - especially if you notice misbehaviour due to frustration, building challenges or struggling to wait while you fix another child's building issue.
-

Transition routine Ideas

Transitions:

Kids of all ages struggle with transitions. Whether it is paying attention to the intro, or stop building for revision or discussion or to stop playing and start packing.

To make transitions smooth:

- Establish transition routines and signals. For e.g. when you ring the bell, the children must leave their models and come sit down.
- You can use non-verbal signals like clapping or ringing the bell Or verbal ones like a song or a chant
- For packing just take away motors and battery boxes. Start handing out pack up sheets as a signal that packing up is imminent.
- Give warnings. In 2 minutes we are heading into the class. 5 more minutes and then we all head back to the floor.
- Be CONSISTENT. If you are confused about the routine – its going to cause you a lot of trouble from Week 3.

More transition routine ideas:

- Clap a pattern. Children respond by clapping the pattern back. Used for moving from building to listening
- Put your hand on your head. Say "Hands on Top". Children to do the same and say - "That means stop" - Use this to start packing
- Say 1,2, 3 - Eyes on me. Kids respond - 1,2, - Eyes on you
- Some song ideas are given below.

Transition songs

To get attention at intro OR revision:

Let's make a circle, round like the sun

A place for you, A place for me

A place for everyone to be

Let's make a circle, round like the sun

Quickly put your eyes on me, eyes on me, eyes on me,

Quickly put your eyes on me, so we can start you see!

Crisscross apple sauce

Give a little clap

Crisscross apple sauce

Hands on your lap

Crisscross apple sauce

Quiet as can be

Crisscross apple sauce

Eyes on me!

Transition songs

Everybody listening, listening, listening

Everybody listening just like <name of child who is listening>

To initiate pack up:

Twinkle Twinkle Little Star

Time to clean up where you are

Put the Lego/blocks back in place

Keep a smile upon your face

Pack up, Pack up – Everybody lets pack up

Lets pack up today

To gather children to walk in or walk out of the room:

I am waiting, I am waiting, I am waiting for a line

A straight one, a quiet one

I am waiting for a line

Games and Game ideas

Energisers – or quick little group games are great way to start the class more positively.

Also it gets kids to release some energy before the long build and concentration that requires.

You can use games at the start of intro and revision both.

Game ideas:

- Simon says is by far the best one
- Another good one is Hangman
- Another game is to get kids to say a number each – starting with one. So 1, 2, 3, 4, and so on. But at 5 and every multiple of 5 child does not have to say the number – they have to clap. If they forget they are out. You can increase the complexity by doing a different action – say jump for a multiple of 3, clap for a multiple of 5 and sit if multiple of both. This can work well for large RB groups.
- Going round in a circle, one person says a word, the next person says a word that starts with the last letter of previous word
- Clap out rhythms and get kids to clap them back to you. Do it faster and faster so you have their full attention.

Consequences for misbehaviour

- Misbehaving children have to answer more questions
- Misbehaving children get less battery time or less Lego people
- If a child refuses to participate – support them by building first couple of steps. If still refusing – encourage them to build their own thing with the Lego tray. Goal is that they shouldn't distract or disturb other kids. Please let me know straight away.
- Abusing in the class by any child is **STRICTLY NOT TOLERATED**. Stop the use of swear words (even as a joke) immediately and report the incident to me at the end of your shift.
- Spoiling another child's class experience by shouting, throwing Lego, fighting, hitting or any other disruption is **STRICTLY NOT ALLOWED**. After 2 warnings, the child's Lego can be taken away and the child be asked to separate themselves from the group. (Sit separately). In the warning you have to inform the child that this will be done.
- As a general rule we deal with misbehaviour through positive redirection. Get the misbehaving child to focus on their task or if they refuse to engage with the Lego - ask them to help you, write on the board, read a book, etc. If everything fails, they are to be given **a time out in the room. The child is never to be sent outside the class room for any reason until the parent arrives.**

Positive behaviour:

- Get Stickers
- Get extra lego people
- Model chosen by instructor for show and tell
- If they finish build faster, they can do special extensions. Show the extension to the group and appreciate the child. Get the child to go around showing their extension to the class.

Child safety - your responsibility

Children arriving and leaving

- Most children walk themselves to the room where we hold the classes. Sometimes children may have to be walked from certain locations within the school campus. Process varies from school to school. You will be informed of processes for the school you are rostered at - at the start of each term.
- Every instructor is responsible for their own group of kids. Please ensure you take your own group's attendance dilligently each week and mark of the roll on paper. Names of any missing children **MUST BE whatsapped to me straight away - whether it is first week or last.** Process varies for tracking missing children in each school. DUE DILLIGENCE MUST BE FOLLOWED in this regard - no matter what the circumstances.
- Children never leave the classroom unless picked up by parent. After care children to be walked over to after care and handed over to after care co-ordinator. Best if you have a quick chat/signal after care co-ordinator and let them know that kid has been handed over.
- Children always go to toilets in pairs.
- Similarly, children should never be left alone without an adult. If parents are late, you are to wait with the child until the parent returns.
- As far as possible, instructors should find and use staff bathrooms before the session starts. Instructors may leave the room only under exceptional circumstances - MAINLY to find missing children or taking an injured child for treatment, etc.
- YOU ARE ACCOUNTABLE - For example, If you are rostered for BC at a particular school - you are accountable for the safety of all those BC children. You must be aware of where they are at all times and make sure at pick up that they leave with an adult. Strictly signing out children at pick up is the best way to ensure this.

Emergency response

While parents are aware that we are not medically trained for any serious issues - we still have duty of care towards the children in our class. Please follow the following processes in case of medical incidents.

In case of minor (non life threatening) medical incidents – minor wounds, vomiting etc.

- Firstly, contact the child's parent – their contact number is present on the attendance sheet. Discuss the situation and ask the parent if they want to pick up early or wait until 5 pm
- You are **STRICTLY NOT TO** administer any sort of medical treatment to the child. The only possible exception to this would be band-aids on tiny cuts or scratches.
- If the parent refuses to come early for pick up, but the child refuses to participate in the lesson further - that is ok. The child is to strictly remain in the room at all times until the parent arrives.
- Fill out incident report after the class

In case of major (life threatening) medical incidents – major wounds, blood loss, blocked airways, asthma attack, etc.

Emergency response

- Contact 000 first and the parent afterwards. Follow instructions of emergency operator after informing them of the situation. They may ask you to find inhaler or administer epipen.
- One instructor in the team is to contact me (director) immediately.
- Stay with the child until the ambulance and/or parent arrives.
- Ask remaining children to pack up. **Class will not proceed.**
- As a general rule instructors are NOT TO ACCOMPANY the child in the ambulance unless we can maintain staff ratios at the class. For example in a 3 or 4 instructor session, one instructor may choose to accompany the child, but NEVER in a 2 instructor or 1 instructor situation.
- Call parents of other children and ask them to collect their child. Inform them that the class has finished early due to emergency.
- Wait until all children have been picked up. You can pack up while you wait.
- Fill out incident report after the class.

Incident report and behaviour report forms are found in dropbox and are to be used for all such reporting.

Photography

- All teachers are to photograph children with their models at the end of each session.
- The photos should focus on the model and the individual child or pair that built the model. Zoom in and avoid unnecessary background details in the image.
- **IMPORTANT:** At the start of the class go through the photo consent column of your group and identify the children with photo consent No. These children are strictly NOT to be photographed.
- There is always some risk involved in storing so many photos of children on your personal device. Best practice would be to upload photos to our Whatsapp photo group and delete them from your personal device immediately after your shift ends.
- All photos **MUST BE DELETED** from personal devices latest by the end of term. Remember to empty your phone device trash bin as well (if any).
- You are strictly not to store any photos of the children on any other personal device or cloud account for any reason. Make sure that photos are NOT automatically uploading to your personal cloud account from your phone.
- You are strictly not allowed to share any photos of children in Young Engineers classes on personal social media accounts or to any third parties. **This is the case even if you are present in the picture.**
- Example of good photos below:
 1. Model in the centre
 2. Properly composed children holding the model
 3. Natural Light on the child (not a dark corner of the room)

Photography



Parent Communication

Only appreciate the child to the parent. Only be positive with parents.

Communicating with parents

- Always remain positive, cheerful and humble while dealing with parents.
- As a general rule, all Lego is packed up and children leave immediately at the end of a session. If any parent inquires about what they built you can mention the model name and tell that they will receive a newsletter with details at the end of the week. If some parent is inquiring about their child's behaviour in the class you are expected to remain positive. Use words like
 - Determined
 - hard-working
 - creative
 - imaginative
 - good visual spatial processing
 - amazing engineering skills
 - thinks outside the box
 - learning critical thinking skills for the future
 - innovative design thinking
 - developing an integrated approach to science and maths
 - ability to translate science principles into practice
 - developing resilience and problem solving ability
 - Great focus/concentration/absorbed and stuck to the task till the end
 - **If parents have any complaints – DO NOT address them.** Tell them that their concerns have been duly noted and the director will contact them directly regarding this.
 - Fill out the complaint or concern in the incident report form.
 - Any kind of threatening or abusive behaviour from parents **WILL NOT BE TOLERATED.** In such a situation, remove yourself away from the parent, ignore the parent and continue doing your work. After due examination of the incident, the child's admission will most probably be cancelled by me.
 -

Admission inquiries

- Parents who are not enrolled may show up to class with their child. Children who are NOT booked in are strictly not allowed. We do not do free trials.
- IMPORTANT - If a child shows up to the class WITHOUT an adult and the child's name is not on the roll, please note down the child's name on the roll and let them attend the class. We cannot let the child wander around for the duration of the class.
- All re-enrollments and enrollments to be done online through website.
- It is NOT YOUR JOB to answer queries related to admissions, re-enrolments, credit for missed classes, child behaviour management, photo policy, any policies and procedures etc. Redirect all such queries to me. It is always better to play it safe than end up saying something inadvertent. Obviously you can answer simple questions like how are they doing in the class, what did they learn etc (as mentioned in the previous page)
- **Do not talk to the parents about child's misbehaviour.** In case the child was not allowed to build, you can inform the parent that there was a behaviour incident in the class due to which the child did not fully participate in the class that day. Our Director will get back to you about this. Report to me (director) and I will address the issue with the parent. Use the child behaviour report form to report behaviour
- Can pass my business number - 0478534693 to parents
-

Taking care of equipment

Lego trays and electronics

The equipment used in classes including tablets, Lego and electronics is worth over \$50000. All the electronic equipment is extremely expensive and is to be handled and maintained responsibly. During class:

During pack up:

1. Children are strictly not allowed to carry trays around the class or keep them on the floor.
 2. Lids are to be taken away at the start of the lesson. They are easily breakable and can cause injuries when broken.
 3. All tablets, motors, sensors, hubs and other electronics are to be handled with respect. Instructors have to proactively stop children from treating these equipment as toys.
 4. **Motors:** - These can break internally if swung around by their wire. Internal wiring also breaks when the heavy boxes and hubs are left to dangle on the wire. Instructors have to **proactively stop children** from holding motors by their "tails", turning motors on when they are not attached to the model, turning the motor on when the wire is twisting or trapped in the Lego.
 5. **Battery boxes and hubs-** If the children are carrying their models around, they must first disconnect the hub or battery from the motor. Hubs are to be connected and turned on ONLY when the model is properly placed on the table or floor.
1. Once children have packed away the trays, you are to check each tray, refill missing pieces and then close the lid.
 2. The best way to refill trays is to fill them out from pieces of 1 or 2 other trays. The last 2 trays are then to be refilled from the spare parts box.
 3. Pack the larger boxes according to their labels.
 4. **Pack up check list** - Kit droppers are to carefully count all tablets and mark of the pack up check list before leaving the room
 5. **Final scan-** Always do a final scan of the floor to pick up any fallen Lego. Remember to do a final check of the room to ensure everything has been packed away, room reset and nothing left behind.