

contents in detail

preface	xi
1	
the right stuff: do you have what it takes to build “living” robots?	1
the starting point.....	1
some parts are recommended, not required.....	2
the education resource set—recommended for everyone.....	2
hassepins—an NXT favorite	2
3 × 5 L shape with quarter ellipse beams.....	3
where to find parts	3
peeron	3
pick-a-brick.....	5
TECHNIC accessories.....	5
companion website	7
2	
the zookeeper’s guide:	
what you need to know to create the animals in the NXT zoo	9
coast vs. brake	9
direction.....	9
downloading a program from your computer to the NXT brick.....	10
changing inches to centimeters.....	10
my blocks.....	11
pins.....	14
port selection.....	14
power settings.....	14
3	
hip-hoppers: an NXT frog and rabbit	15
ribbit: an NXT frog.....	15
building ribbit.....	17
wiring connections	28
bunny: an NXT rabbit.....	30
building bunny.....	31
wiring connections	45
programming ribbit and bunny.....	45
hopping program #1: random hopping.....	46
hopping program #2: create your own pattern.....	51

4		
	sandy: an NXT camel	57
	building sandy.....	58
	legs (build four)	59
	full assembly.....	63
	wiring connections	78
	programming sandy.....	79
	my block: camelwalk	79
	the main program	82
5		
	spiderbot: an NXT spider.....	85
	building spiderbot.....	86
	pause now to test your robot's legs	100
	wiring connections	103
	programming spiderbot.....	103
6		
	snout: an NXT 'gator	111
	building snout.....	112
	base.....	113
	back feet (build two).....	120
	head	122
	left leg.....	126
	right leg.....	131
	tail.....	135
	full assembly.....	140
	wiring connections	142
	programming snout.....	144
	my block #1: gator_walk.....	144
	my block #2: gator_mouth	147
	the main program	152
7		
	LEGOsaurus: an NXT dinosaur.....	155
	building LEGOsaurus.....	156
	base.....	156
	legs (build four)	163
	armor.....	166
	full assembly.....	169
	wiring connections	180
	need some help troubleshooting this robot?	180
	programming LEGOsaurus.....	180

8		
	pygmy: an NXT elephant.....	187
	building pygmy.....	188
	base.....	189
	head.....	202
	legs (build four).....	215
	trunk.....	219
	full assembly.....	220
	wiring connections.....	223
	programming pygmy.....	223
	my block: elephant.....	223
	the main program.....	226
9		
	polecat: an NXT skunk.....	229
	building polecat.....	230
	body.....	231
	head.....	237
	tail.....	241
	full assembly.....	257
	connecting the cannon trigger.....	258
	wiring connections.....	258
	programming polecat.....	259
	my block: tail.....	260
	the main program.....	261
	final program with multiple runs.....	264
10		
	strutter: an NXT peacock.....	265
	building strutter.....	266
	front wheel (build two).....	268
	left wing.....	269
	right wing.....	271
	full assembly.....	274
	a pulley system for the wings #1.....	292
	a pulley system for the wings #2.....	299
	wiring connections.....	299
	troubleshooting tip.....	299
	programming strutter.....	300
	my block #1: shake.....	300
	my block #2: shakePlus.....	303
	the whole program.....	305

A	
enrichment ideas for teachers	307
ultrasound	307
mathematical calculations in NXT-G programming	307
simple machines	308
ideas for investigation	308
investigation #1: what is the best leg length for your robot?	309
investigation #2: how does leg design affect the center of gravity?	309
investigation #3: how does the method of programming a robotic turn affect the result?	309
investigation #4: how can you make a specific robot go exactly where you want it to go?	309
investigation #5: how does weight distribution affect function?	310
investigation #6: how can we accurately program a turn in a specific walking robot?	310
investigation #7: which string is best for use on pulleys in robots such as pygmy and strutter?	310
using your findings	311
the arts	311
B	
troubleshooting	313
are your gears grinding and pulling the robot apart?	313
what if your robot walks in place, instead of moving forward?	315
does your robot seem to be ignoring your programming directions?	316
whatever you do . . .	316
C	
web resources for the NXT	317
index	319