Activity sheet 6

6a. Complete this table to define how adding axes of motion expands how a robot arm can move and manipulate an object or tool.

Forward Back	Left Right	Up Down	Yaw	Roll	Pitch	Axes	Motion capability
Y						1	
Y	Y					2	
Y	Y	Y				3	
Y	Y	Y	Y			4	
Y	Y	Y	Y	Y		5	
Y	Y	Y	Y	Y	Y	6	

6b.

How could a robot designer add a 7th axis of motion?

What might this 7th axis enable the robot arm to do?

Activity sheet 7

List what translations will allow the robot arm to stack two layers of six boxes on the pallet.

	Place			Return		
	X	Y	Z	X	Y	Z
Layer 1						
A						
B						
C						
D						
E						
F						
Layer 2						
A						
B						
C						
D						
E						
F						

Activity sheet 8

8a. Describe how a programmer can define the movement of the arm from one point to another.

Absolute:

Relative:

What is the shape of the robot's work envelope and what limitations define this shape?

What two factors will define how the arm moves from one point to the next and the line it describes as it moves?

8b. Imagine that the arm can also move up and down (in and out of the plane of your screen). What shape is this new 3D work envelope?

What additional information do you need to program movements within this new 3D space?