

### Box 1: Conditioning monkeys

Start with a cage containing five monkeys. Inside the cage, hang a banana on a string and place a set of stairs under it. Before long a monkey goes to the stairs and starts to climb towards the banana. As soon as he touches the stairs, spray all the *other* monkeys with cold water. After a while, another monkey makes an attempt with the same result. All the other monkeys are sprayed with cold water. Pretty soon, when another monkey tries to climb the stairs, the other monkeys will try to prevent it. Now, put away the cold water. Remove one monkey from the cage and replace it with the new one. The new monkey sees the banana and wants to climb the stairs. To his surprise and horror, all the other monkeys attack him. After another attempt and attack, he knows that if he tries to climb the stairs, he will be assaulted. Next, remove another of the original five monkeys and replace it with a new one. The newcomer goes to the stairs and is attacked. The previous newcomer takes part in the punishment with enthusiasm! Likewise, replace a third monkey with the new one, then a fourth, and then a fifth. Every time the newest monkey takes to the stairs, he is attacked. Most of the monkeys that are beating him have no idea why they are not permitted to climb the stairs or why they are participating in the beating of the newest monkey. After replacing all the original monkeys, none of the remaining monkeys have ever been sprayed with cold water. Nevertheless, no monkey ever again approaches the stairs to try for the banana. Why not? Because as far as they know that's what has always been done around here.

### Box 2: Building the Shuttle

When you see a Space Shuttle sitting on its launch pad there are two big booster rockets attached to the sides of the main fuel tank. These are solid rocket boosters (SRBs). They are made by Thiokol at its factory in Utah. The engineers who designed these SRBs would have preferred to have made them a bit fatter; but they were constrained due to the size of two horses' backsides in Imperial Rome. What does the size of horses backsides in Imperial Rome have to do with booster rockets? Two horses were used to pull Roman war chariots. As the Roman army spread across Europe (including England) they built the first roads; and these roads have been used ever since. These Roman war chariots made ruts in the roads. Since the chariots were made for Imperial Rome, they were all alike in the matter of wheel spacing. Consequently, the ruts in English roads had a fairly standard spacing. The builders of other wagons continued to use the same wheel spacing because if they tried to use any other spacing the wagon wheels would break on some of the old Roman roads. So, throughout the mediaeval period this wheel spacing was used. When, during the Industrial Revolution, trucks had to be built for the new railways, the old wagon jigs and tools were used and this meant that the new trucks had the same wheel spacing. This became the standard gauge for railways: 4 feet 8½ inches. And when English expatriates built the US railroads they continued to use this gauge. Now we come back to the SRBs. They had to be shipped by rail from the factory to the launch site. The railway happened to run through a tunnel in the mountains. The SRBs had to fit through this tunnel. The tunnel is slightly wider than the railway track, and the track as we know is about as wide as two horses backsides.