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Title: Science course unit 5.

Producer: Tony Jolly.

Contributors: M.J. Pentz,
A.J. Walton,
G.F. Elliott.

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Summary: The programme looks at (1) the states of matter and the forces which bind atoms together. (2) Distribution of molecular velocities in a gas and a method for measuring this.

Seq.	Time.	Footage.	Sequence List.	Sound Cue
1	1'21"	20	Mike Pentz with samples of ice, liquid water and steam. He speculates on the forces which might be responsible for changes of state.	
	5'54"	87	Alan Walton discusses the binding and repulsive forces which hold atoms together and determine their state of matter. He explains how a ball bearing analogue illustrates these forces on an atomic scale.	...have enough fingers.
2	7'37"	111	Walton operates the analogue. He vibrates the ball bearings at a gradually increasing rate until the kinetic energy in the system simulates the change from solid to liquid state. Walton adds a white ball bearing to make it easier to see what is happening.	So I built...
	8'19"	121	Walton compares still photographs of the simulated liquid and solid, counting the numbers of nearest neighbours around single random atoms. More shots of the analogue in action.	
	10'45"	152	Walton adds more white ball bearings to his simulation in order to illustrate the property of diffusion in liquids, He then demonstrates diffusion of real liquids in test tubes.	....break it up.
3	11'50"	166	Walton performs an experiment which demonstrates diffusion of a gas. He introduces Bromine gas into an evacuated tube.	Now watch this...
	12'52"	179	Walton vibrates the ball bearing analogue at greater speed until the gaseous state is simulated.	
			Walton uses a strobe lit photograph of the above analogue in its gaseous state to demon-	

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Continuation

Seq.	Time	Footage	Sequence List	Sound Cue
	13'53"	192	strate how velocities of moving molecules can be calculated. He plots the discribution of ball bearing velocities obtained by this method on a graph.	....at what speed.
4	14'42"	201	Mike Pentz sums up the ideas presented in this programme so far and then introduces Gerald Elliott.	So we see...
	16'10"	219	Gerald Elliott briefly sums up the ideas which the course has presented so far and also those items yet to be studied.	
	16'58"	229	Film shots, under magnification, of pollen grains in suspension, illustrate the phenomenum of Brownian motion.	
	18'38"	248	Elliott demonstrates the random movement of gaseous molecules using, as an analogue, an air cushion table and freely moving discs. The movements of the discs simulate Brownian motion. More film shots of the pollen grains in suspension.	...or the liquid.
5	19'19"	268	Elliott explains the principles of an experiment which can measure, directly, the distribution of molecular velocities in a gas. Animated graphics are used as aids.	N ow I want...
	23'11"	299	Elliott uses a water syringe analogue of the experiment to demonstrate how the apparatus will work. Diagrams and photographs of the apparatus are also used.	
	23'59"	308	Elliott uses an animated graph to build up the curve which results from the actual experiment. The curve represents the distribution of molecules at particular velocities. Credits.	