Matching Socks

Suitability	Elementary	Secondary
Key mathematical ideas and concepts	Probability; Outcomes; Event; Trial; Equally likely	
	Frequency; Relative frequency; Estimate	Conditional probability; Combination; Permutation; Sample space; Tree diagram

Procedures		
	Act 1	Video Synopsis: When the dryer is done, Ming gets 12 socks (6 black, 4 white and 2 grey) from the dryer and puts them in the laundry basket. After she wakes up in the next morning, she picks two socks randomly without seeing. However, the two socks she picks don't match since they are one black and one grey. Video link
		Teacher Notes: 1. Show students Act 1 video and ask: - *What did you observe?* - *What do you wonder?* 2. Allow students to think and discuss what kind of scenario the video is about. 3. Direct students to ask for playing the video again since many of them will not count the number of socks of each color when the video is played the first time. 4. Show students Act 1 video again and ask: - *How many socks of each color have you noticed?* - *What kind of problem does she meet?* - *How can she solve the problem?* 5. Allow students to discuss again. 6. After the discussion all of them should be able to figure out the number of	Teacher Notes: 1. Show students Act 1 video twice and ask: - *How many socks of each color have you noticed?* - *What kind of problem does she meet?* - *How can she solve the problem?* 2. Allow students to think and discuss. 3. Encourage them to use mathematical/statistical vocab. 4. By knowing the answers to teacher's questions, students should be able to sense that the entire task is about probability and related calculation.

		socks of each color and to realize that these 2 socks she picks don't match.	
	Act 2	Resources provide upon request: ● An opaque box ● 12 socks (6 black, 4 white and 2 grey) Teacher notes: 1. Ask students: *- Is she more likely to pick black socks than grey or white socks?* *- Is she more likely to pick a pair of socks that match or that don't match?* 2. Encourage students to test by drawing 2 socks from the box repeatedly with placements. 3. Students solve the question.	Resources provide upon request: ● Pencil ● Scratch paper Teacher notes: 1. Ask students: *- How many combinations are there of a pair of socks randomly picked from the laundry basket?* *- What's the possibility of each combination?* *- What are the possibilities of getting a pair of socks that match and don't match respectively?* 2. Encourage students to list all the outcomes by drawing the tree diagram on the scratch paper and then do the following calculation. 3. Students solve the question.
	Act 3	Video Synopsis: Ming puts the grey sock back to the laundry basket and picks another black sock. Now they match! Ming then puts them on. [Video link](#) Teacher notes: 1. Play the Act 3 video 2. Reveal the answers to the questions of Act 2: *- It's more possible for Ming to draw black socks .* *- It's more possible for Ming to pick a pair of socks that don't match.*	Teacher notes: 1. Play the Act 3 video 2. Reveal the answers to the questions of Act 2: *Combinations: BB, BW, BG, WW, WG, GG;* *P(BB)=30/132=5/22* *P(BW)=48/132=4/11* *P(BG)=24/132=2/11* *P(WW)=12/132=1/11* *P(WG)=16/132=4/33* *P(GG)=2/132=1/66* *P(match)=1/3* *P(not match)=2/3*