

# The Skyline Express

## A Participation Quiz



This is **not** a quiz where you need the right answer.

**Instead**, you are graded on how you participate and contribute to your group's work on the problem. *You will be helpful to your group if you are:*

- Good at asking other group members questions
- Good with organizing puzzle pieces
- Good with keeping lists
- Good at appreciating someone else's ideas
- Good at finding ways to break numbers apart
- Good at drawing pictures of ideas
- Good at finding patterns

*I will also be looking for groups that...*

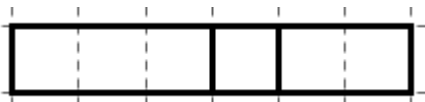
\* use mathematical language, \* use materials and tools in different ways, \* discuss the problem with all members

**#1:** How many different trains can be formed with total length 5?

**#2:** How many different trains can be formed for other lengths?

**#3:** How many trains can be formed if we only allow the size 1 and size 2 cars?

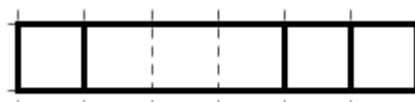
Trains can be formed by attaching cars of different length together. Here are some examples:



3 cars  
Length 6



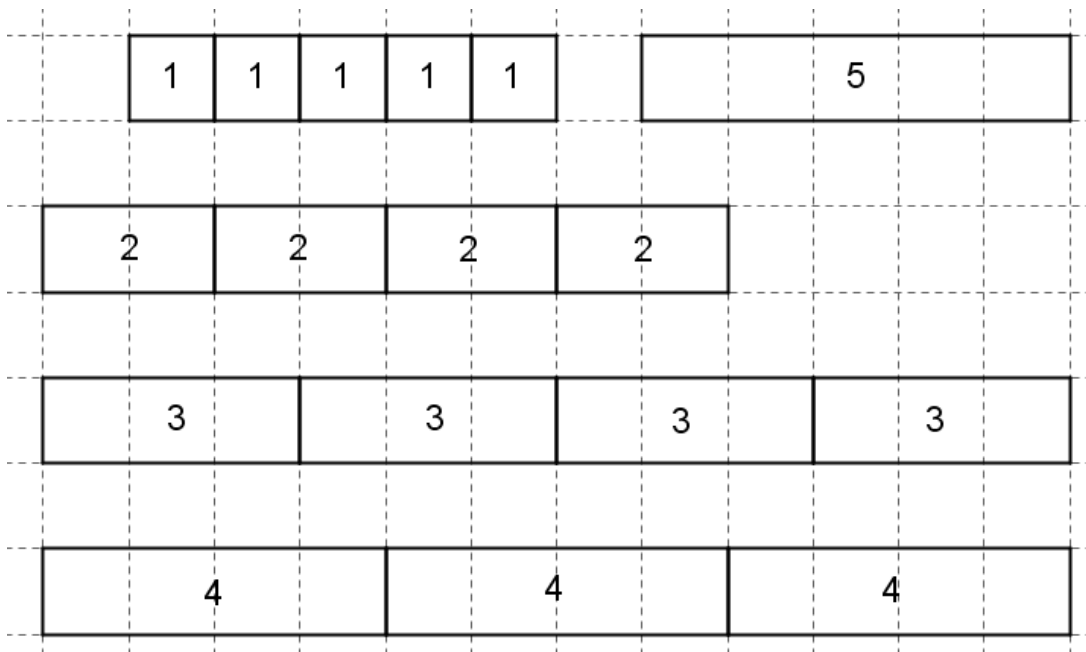
3 cars  
Length 6



4 cars  
Length 6

Notice that even though the first two trains use the same cars, they are in a different order, so we count them as different trains.

Cutouts:



Extensions:

**#4.** How many trains with length  $n$  can be formed, if we do not care about the order of the cars?

**#5.** How many trains can be made with length  $n$ , if we are limited to prime-length cars?

**#6.** Limiting yourself to prime-length cars, find the first train length that requires more than two cars.

1	1	1	1	1		5	
---	---	---	---	---	--	---	--

2		2		2		2	
---	--	---	--	---	--	---	--

3			3		3		3
---	--	--	---	--	---	--	---

	4			4			4
--	---	--	--	---	--	--	---

1	1	1	1	1		5	
---	---	---	---	---	--	---	--

2		2		2		2	
---	--	---	--	---	--	---	--

3			3		3		3
---	--	--	---	--	---	--	---

	4			4			4
--	---	--	--	---	--	--	---

1	1	1	1	1		5	
---	---	---	---	---	--	---	--

2		2		2		2	
---	--	---	--	---	--	---	--

3			3		3		3
---	--	--	---	--	---	--	---

	4			4			4
--	---	--	--	---	--	--	---

**Group #1**

Leon  
Jimmy  
Eboney  
Thomas  
JiaYing

**Group #2**

Vinh  
Ratina  
Orgil  
Fremont  
Bryant

**Group #3**

Saul  
Ray'ah  
Michael  
Luis

**Group #4**

Eugene  
Marisol  
Linh  
Ta'Najee

**Group #5**

Deisha  
Marco  
Trinh  
McKay

**Group #6**

Julia  
Jose  
Desiree  
Serron

**Group #1**

Nicole  
Eudoxie  
Christina  
Keiana  
Julian (H)

**Group #2**

Juliann (T)  
Leeza  
Jordan  
Tasia

**Group #3**

Guadalupe  
Andrew  
Catherine  
Johnny

**Group #4**

Viet  
Daniel  
Ashanti  
Paradise

**Group #5**

Robin  
Vionna  
Yanitza  
Edra

**Group #6**

Terilyn  
Shikiri  
Christy  
Kevin

**Group #1**

Nhia  
Andres  
Dashaunte  
Sophia

**Group #2**

Nathaniel  
Marina  
Gabino  
Briann

**Group #3**

Bidemi  
Michelle  
Miles  
David

**Group #4**

Virginia  
Rosemary  
Oceanna  
Jabari

**Group #5**

Pedro  
Linh  
Paul  
Jocelyne

**Group #6**

Jinli  
Zachary  
Thao  
Jonathan

**Group #7**

Silkquoiah  
Juan  
Elliot  
Salah

**Group #8**

Brandon  
Javon  
Breah  
Jayson