

**USING PAIRED CONSTRAINTS
TO SOLVE
THE CREATIVITY PROBLEM**

Structuring A Creativity Problem

Initial State

Existing style or solution

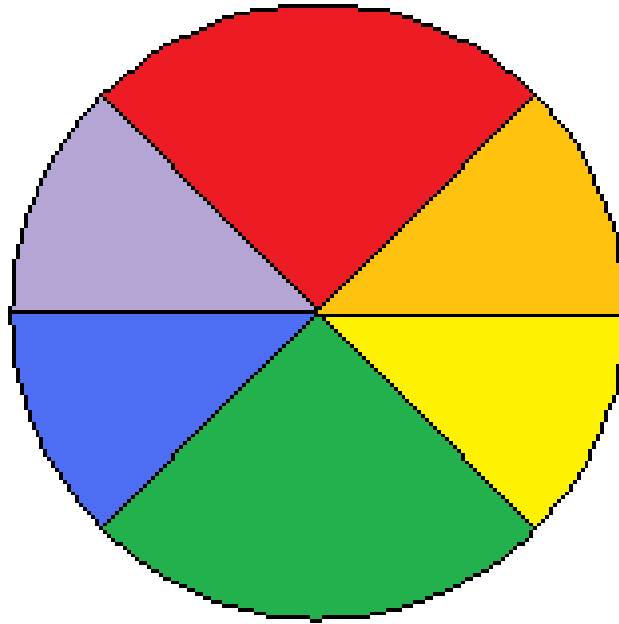
Search Space

Constraint pairs for constructing solution paths
(Preclude → Promote)

Goal State

New style or solution

Color Wheel



Regatta at Argenteuil (1872)



Monet's First Substitution Series

Initial State

Paint the things which reflect light

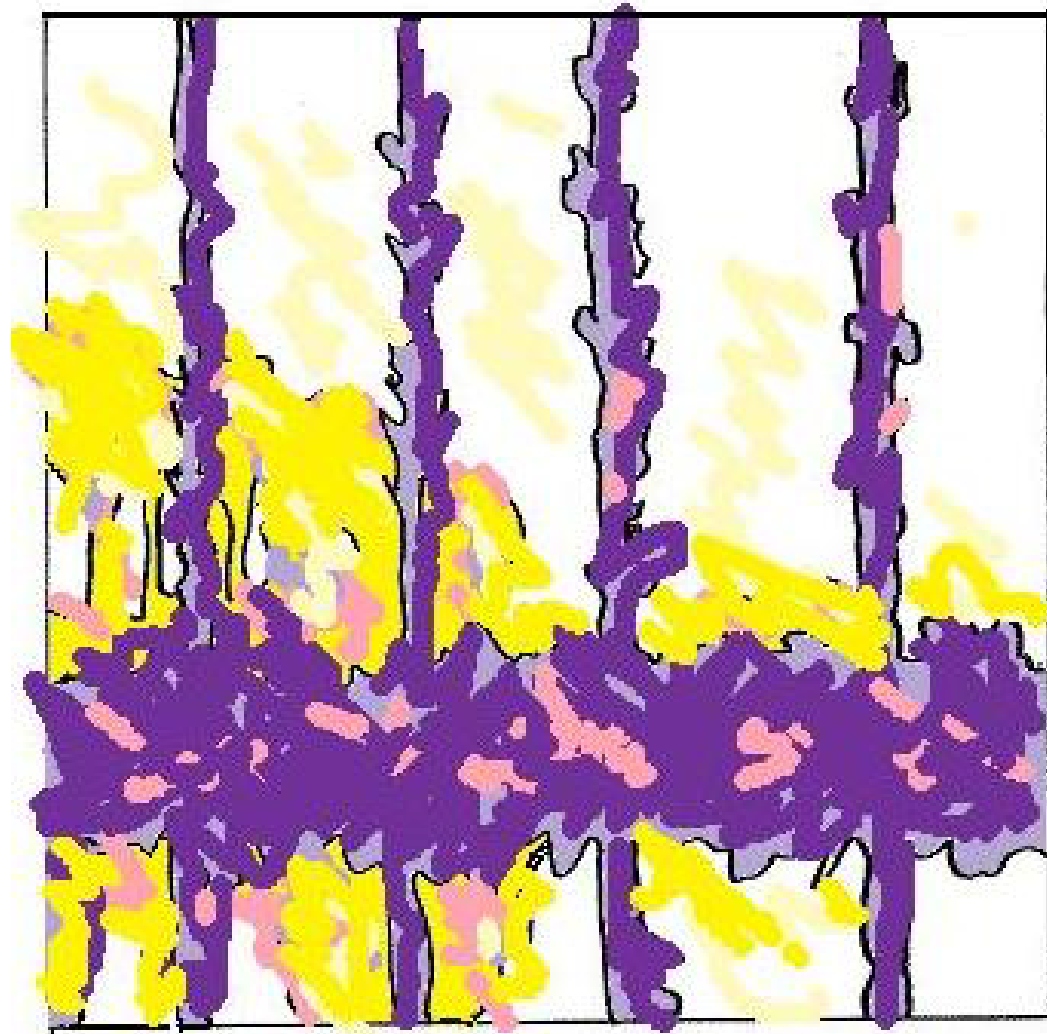
Search Space

Preclude the object	→	Promote the armature
Preclude permanence	→	Promote immediacy
Preclude value contrasts	→	Promote contrasts in hue
Preclude sharp edges	→	Promote indistinct edges
Preclude continuous surface	→	Promote separate strokes
Preclude depth	→	Promote surface

Goal State

Paint how light breaks up on things

Poplars, 1891



Monet's Second Substitution Series

Initial State

Paint how light breaks up on things

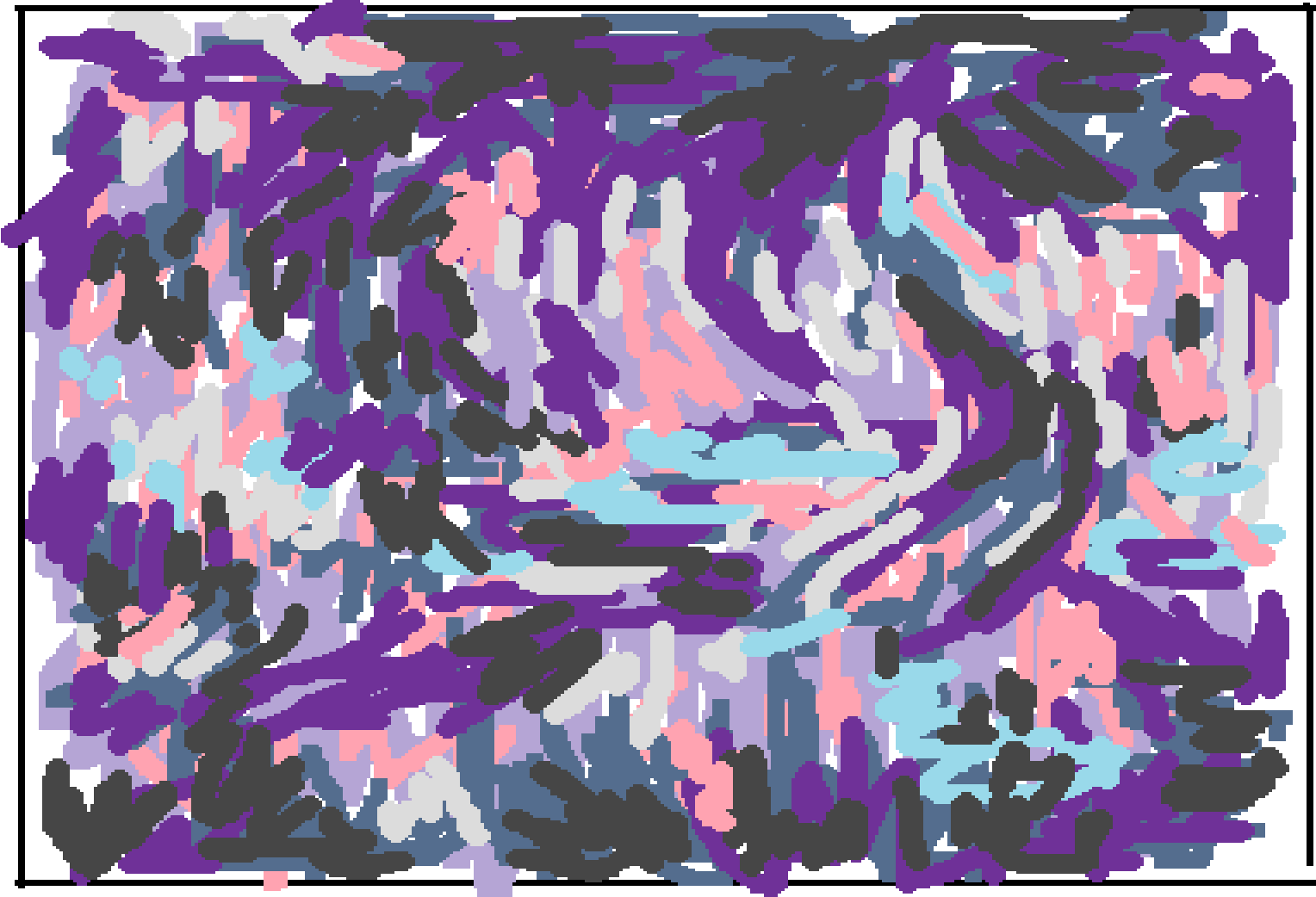
Search Space

Preclude the armature	→ Promote the atmosphere
Preclude changes in motif	→ Promote series of same motif
Preclude local color	→ Promote shared color
Preclude separate strokes	→ Promote overlapping strokes
Preclude focus	→ Promote scattered attention

Goal State

Paint how light breaks up between and around things.

Water Lilies - Reflections of the Willow
(1918-25)



Monet's Third Substitution Series

Initial State

Paint how light breaks up between and around things

Search Space

Preclude composition by shape	→ Promote composition by color
Preclude boundaries	→ Promote color field
Preclude description	→ Promote decoration
Preclude the distant	→ Promote the close-up
Preclude series of moments	→ Promote expanding one moment
Preclude attention	→ Promote immersion

Goal State

Paint how light itself breaks up.

Initial State

Current math curricula

Search Space

Preclude

Non-numeric
English language count
Multiple manipulatives
Split practice

→
→
→
→

Promote

Numbers, symbols, patterns
Explicit base-10 (Asian) count
Single manipulative
Deliberate practice

Goal State

New curriculum (*Only the NUMBERS Count*©)
Criterion: think in numbers, symbols, patterns

Explicit Base-10 Count

Tens

10 ten
11 ten-one
12 ten-two
13 ten-three
14 ten-four
15 ten-five
16 ten-six
17 ten-seven
18 ten-eight
19 ten-nine

Two-tens

20 two-ten
21 two-ten-one
22 two-ten-two
23 two-ten-three
24 two-ten-four
25 two-ten-five
26 two-ten-six
27 two-ten-seven
28 two-ten-eight
29 two-ten-nine

Three-tens

30 three-ten
31 three-ten-one
32 three-ten-two
33 three-ten-three
34 three-ten-four
35 three-ten-five
36 three-ten-six
37 three-ten-seven
38 three-ten-eight
39 three-ten-nine

Count-and-Combine Chart 10 to 14

10	=	Ten	=	10					
11	=	Ten-one	=	10					
12	=	Ten-two	=	10					
13	=	Ten-three	=	10					
14	=	Ten-four	=	10					

Multiplication and Division Table

	1	2	3	4	5	6	7	8	9	10
1	1									
2	2	4								
3	3	6	9							
4	4	8	12	16						
5	5	10	15	20	25					
6	6	12	18	24	30	36				
7	7	14	21	28	35	42	49			
8	8	16	24	32	40	48	56	64		
9	9	18	27	36	45	54	63	72	81	
10	10	20	30	40	50	60	70	80	90	100

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