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# Focus On Student Thinking: Engage & Reflect (FOSTER)

## Exploring a Game from our Math Circle



FOCUS ON STUDENT THINKING:  
ENGAGE & REFLECT

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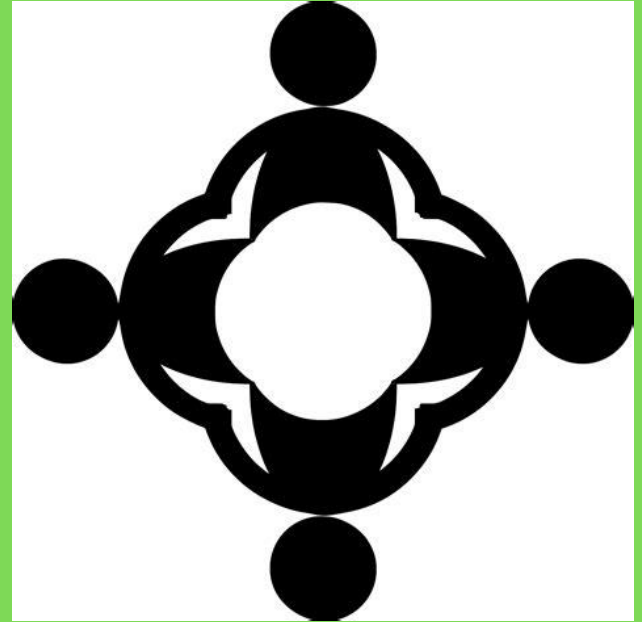
Deb Stetson, [stetson@csus.edu](mailto:stetson@csus.edu)

[www.sacramentomathproject.org](http://www.sacramentomathproject.org)

# Community Connector

With the people around you,  
share your:

- Name
- What brought you here today?



# Play games to...

Play & Learn

Connect with others

Notice stuff

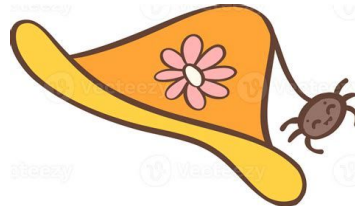
Wonder about strategies & reasons

Ask, “What would happen if...”

Strategize

Justify

Giggle



# Game Play

## Framework Connections

**Play & Learn**

Use Engaging Tasks. Actively investigate & explore.

**Connect with others**

Foster positive disposition toward math

**Notice stuff**

Driver of Investigation: Make sense of the world. Lift student voice - value their insights.

**Wonder about strategies & reasons**

Invite student questions and conjectures. Use student assets: Lift their ideas to add to the class content

**Strategize**

Investigate & explore. Lift student voice - value their insights

**Justify**

Mathematical Practice: Construct viable arguments and critique the reasoning of others. Prioritize reasoning & justification.

**Ask, “What would happen if...”**

Invite student questions.

# <sup>5</sup> Framework: Dimensions of Systemic Change

**See students  
with an asset  
based lens.**

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Challenging  
games tell  
students their  
teacher values  
their ideas

**Actively engage  
through  
investigation and  
connection.**

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Provide  
sense-making  
chances to figure  
things out

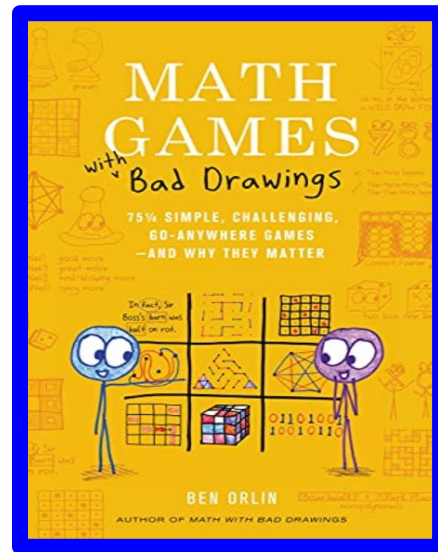
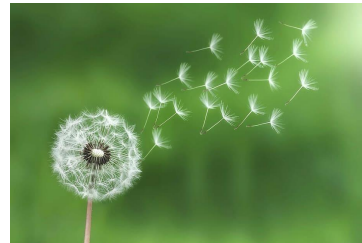
**Value & use  
students' personal  
identities.**

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Learn and use  
students' interests  
and strengths when  
selecting games

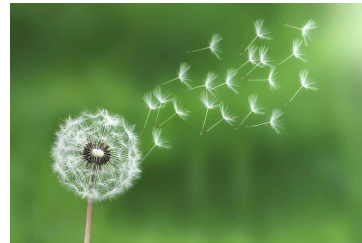
# It's Not Just Blowing in the Wind ...

To Win:

- Dandelions win if seeds or flowers cover every square.
- Wind wins if at least one square is not covered by a dandelion or seed.



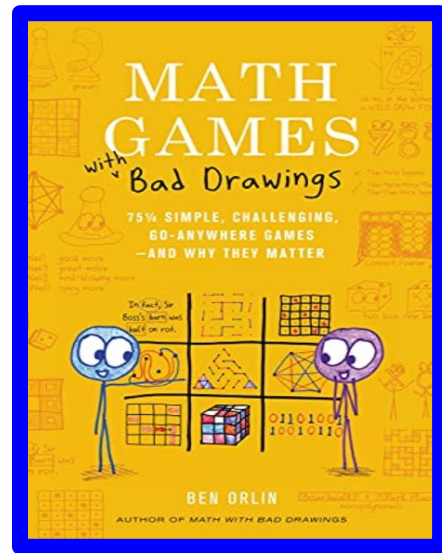
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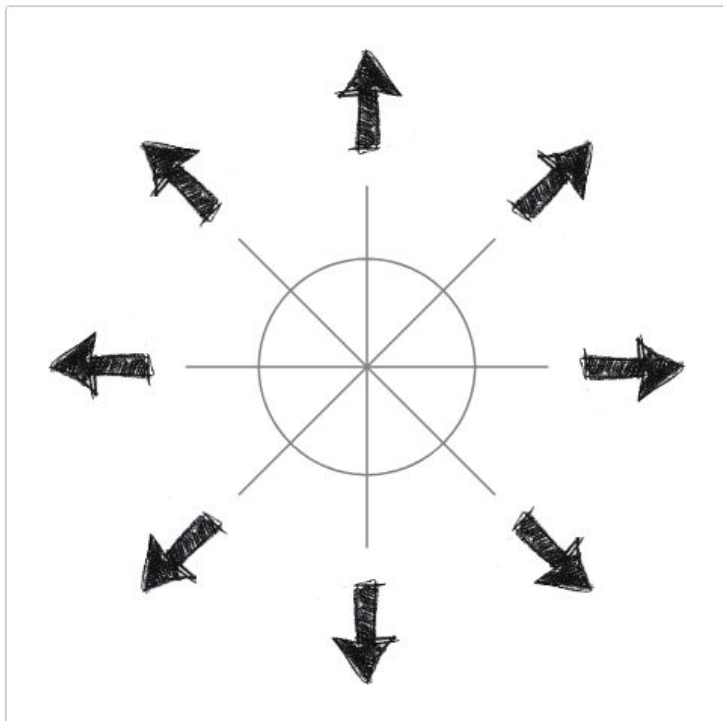
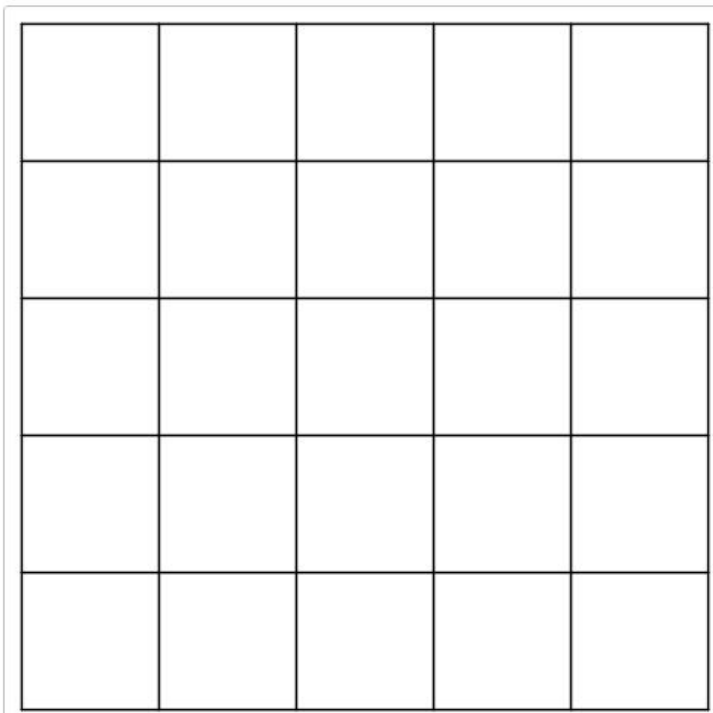
- Dandelion goes 1st, putting a flower in one square.
- Wind can blow in one of the 8 directions resulting in seeds spreading from flowers to any squares in that direction. A direction can only be used once.
- Each player has 7 moves (1 wind direction will remain.)



# Possible Moves

Player v Player

↪ Dandelion's Turn





*The Learning Round:*  
1 Player versus 1 Player



## *Team Play* Round 2: Duo versus Duo



**We Notice...**

**We Wonder...**

**What would  
happen if ...**

# Extensions

What if ...

- The grid is  $2 \times 2$ ,  $3 \times 3$ ,  $4 \times 4$ ,  $6 \times 6$ ,  $7 \times 7$ , ... who wins?
- A dandelion can be planted either in an empty square or on top of an existing seed?
- Seeds grow to dandelions in every other turn?
- You created your own rules?
- You did this with your students? Adjustments?
- Or add your own what if question!



Resource: <https://teacher.desmos.com/activitybuilder/custom/625a0ef8b8a6fa0893acaea0?collections=5ebae3af69d6a00caab6e614>

# A FOSTER Session: activity and focus

<b>Community Connector and Launch (15 m)</b>	<b>Get talking, build personal connections &amp; empathy prior to academic talk. Prepare to play game.</b>
<b>Pairs play 1 on 1 (10-15 min)</b>	<b>Will become a team next round. Collaboratively play to learn together.</b>
<b>Share out (10 min)</b>	<b>Instructors: Lift student voice &amp; Spread ideas. Participants: Value each other's thinking.</b>

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Two Pairs play 2 on 2. (20 - 25 m)	Strategize together to deepen understanding. Look fors: <b>Noticings, Wonders, What would happen if...?</b>
Whole Group Debrief (15 min)	<b>N &amp; W. WWHI?</b> Teaching Moves. Adjustments for TK-12 students.
Closing Reflection--10 m	Shout outs or Aspirations or other Optimistic Closure

# Participants' Notice & Wonders



Noticings?	Wonders?
I noticed we wanted to start in the center, because no matter what direction, we get 2 seeds. Working inside out was the best for us.	If you fill in straight across the middle or straight down, will that fill in faster?
I noticed moving diagonally in one direction will help spread the seeds in more direction.	

# Participants' Reflections

<b>BEFORE THIS PROGRAM, I USED TO THINK...</b>	<b>AND NOW I THINK...</b>
<b>That games should only be played when I had extra time in my year, if ever, or at the end or beginning of a grading period.</b>	<b>That I need to schedule games into my lesson plans at least every two weeks.</b>
<b>Teachers might resist using games and stations.</b>	<b>They / We are eager to do so. 😊 Yay Us!</b>

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That I could not squeeze non-curricular activities into my lessons.	These games and activities are valuable - kids gain some new ways of thinking and have a chance to do math in a new exciting way. Also great for student bonding with others in class.



# Participants' Reflections

<b>BEFORE THIS PROGRAM, I USED TO THINK...</b>	<b>AND NOW I THINK...</b>
<b>Games were just a fun thing to do.</b>	<b>They can be set as non-curricular tasks as long as student move through the concrete ↔ representational ↔ abstract continuum.</b>
<b>Games were an engaging way to deepen skill and content knowledge</b>	<b>They also can be used to develop logic and perseverance.</b>

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<b>Games were an engaging way to deepen skill and content knowledge</b>	<b>They also can be used to develop logic and perseverance.</b>
<b>I used to think addition and subtraction were the most important part of lower elementary</b>	<b>Number-sense is the most important part.</b>

# Thank You!

And thanks to Ben  
Orlin and this game he  
created.

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## This Deck

[https://bit.ly/2025  
MathFest-FOSTER  
Game](https://bit.ly/2025MathFest-FOSTERGame)



## Desmos



vs.



## FOSTER Slide Deck

