Amplify Desmos Math
CALIFORNIA

Grade K

UNIT 1 | SUB-UNIT 2

Recognizing Quantities

About Amplify

Amplify is dedicated to collaborating with educators to create learning experiences that are rigorous and riveting for all students. Amplify creates K–12 core and supplemental curriculum, assessment, and intervention programs for today's students.

A pioneer in K–12 education since 2000, Amplify is leading the way in next-generation curriculum and assessment. All of our programs provide teachers with powerful tools that help them understand and respond to the needs of every student.

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Amplify Desmos Math
CALIFORNIA

Kindergarten

Unit 1: Math in Our World

Sub-Unit 2: Recognizing Quantities

Math Language Development Resource

Activity Pages and Teacher Support

Explore:
Patterns Found in Nature

EL **Multilingual/English Learners** Use these scaffolds and supports during the **Building Math Habits of Mind** part of the **Explore** to provide more support for your students as they:

- Interpret **(Reading and Listening)** and communicate **(Speaking)** about the mathematical habits of mind they strengthened during the Activity.
- Interact in these meaningful ways:

Collaborative	• Exchanging information / ideas • Offering / supporting opinions	**ELD.PI.9–10.1** **ELD.PI.9–10.3**
Interpretive	• Listening actively • Reading closely	**ELD.PI.9–10.5** **ELD.PI.9–10.6**
Productive	• Presenting information / ideas • Supporting / evaluating opinions	**ELD.PI.9–10.9** **ELD.PI.9–10.11**

Spanish Cognates:

English	*habit*	*mathematics*	*mind*
Español	*hábito*	*matemática*	*mente*

Materials

Students also need access to these additional materials.

In this Resource:

- *Math Habits of Mind: Hábitos mentales matemáticos* Sheet, one per student
- *Questions and Sentence Frames* Sheet (for display)

Explore, Building Math Habits of Mind

Distribute the *Math Habits of Mind: Hábitos mentales matemáticos* Sheet.

Emerging

Read aloud, or ask a student volunteer to read aloud, the first habit of mind in English and in Spanish (for your students whose primary language is in Spanish).

Invite students to collaborate with you to think about whether they used and strengthened this habit of mind during the Activity. Consider asking:

- "Did you make sense of any problems during the Activity?" Invite them to use simple words or phrases, such as **"yes"** or **"no."**
- "If you said yes, show me what part of the Activity you made sense of a problem." Invite students to point to part of the Activity.

Repeat the above for each habit of mind.

Expanding

Invite students to work with a partner to read aloud each habit of mind and then choose at least one that they used and strengthened during the Activity. If possible, pair students together who speak the same primary language and allow them to discuss their responses in their primary language.

Then invite pairs of students to share the habits of mind they chose with another pair of students. Display the *Questions and Sentence Frames* Sheet and invite students to discuss the questions on this sheet and use the provided sentence frames to help them form their responses.

Bridging

Invite students to work with a partner to read aloud each habit of mind and then choose at least one that they used and strengthened during the Activity. If possible, pair students together who speak the same primary language and allow them to discuss using a mixture of their primary language(s) and English.

Then invite pairs of students to share the habits of mind they chose with another pair of students. Display the *Questions and Sentence Frames* Sheet and invite students to discuss the questions on this sheet. Encourage them to craft their own sentences in response to the questions, using the provided sentence frames as needed.

Math Habits of Mind: Hábitos mentales matemáticos

I can slow down and first make sense of a challenging problem before trying to solve it.

Puedo reducir la velocidad y primero darle sentido a un problema desafiante antes de intentar resolverlo.

I can represent real-world problems using equations and inequalities and interpret their solutions within the context of the problem.

Puedo representar problemas del mundo real usando ecuaciones y desigualdades e interpretar sus soluciones dentro del contexto del problema.

I can justify my thinking and ask questions to help me understand the thinking of others.

Puedo justificar mi pensamiento y hacer preguntas que me ayuden a comprender el pensamiento de los demás.

I can apply the math that I know to solve real-world problems, making assumptions and revising my thinking as needed.

Puedo aplicar las matemáticas que sé para resolver problemas del mundo real, haciendo suposiciones y revisando mi pensamiento según sea necesario.

I can select an appropriate tool to help me solve problems.

Puedo seleccionar una herramienta adecuada que me ayude a resolver problemas.

I can communicate my thinking and solutions clearly to others.

Puedo comunicar mis pensamientos y soluciones claramente a los demás.

I can look for structure or patterns to help me solve problems.

Puedo buscar estructuras o patrones que me ayuden a resolver problemas.

I can look for repeated calculations and other repeated steps to make generalizations.

Puedo buscar cálculos repetidos y otros pasos repetidos para hacer generalizaciones.

Questions and Sentence Frames

Why did you choose this habit of mind?

Did you choose any others? Why or why not?

What part of the Activity reminded you of this habit of mind?

Can you tell me more?

I chose this habit of mind because . . .

I also chose _____ because . . .

In the Activity, I . . .

Visual Patterns
Exploring Patterns

EL **Multilingual/English Learners** Use these scaffolds and supports during the **Activity 3, Launch** step to provide more support for your students as they:

- Work toward the language goal in this lesson.
- Interpret **(Listening)** and communicate **(Speaking and Writing)** using the language from this activity, such as *figure, pattern, tile, table*.
- Interact in these meaningful ways:

Collaborative	• Exchanging information / ideas	**ELD.PI.9–10.1**
Interpretive	• Listening actively	**ELD.PI.9–10.5**
Productive	• Writing to describe or explain	**ELD.PI.9–10.10**

Spanish Cognates:

English	*figure*	*table*
Español	*figura*	*tabla*

Materials

Students need access to these materials.

In this Resource:

- *Pattern C* Sheet, one per student

Classroom materials:

- scientific calculators (as needed)

Activity 3, Launch

Distribute the *Pattern C* Sheet and invite students to work in pairs to complete it in place of Screen 7. Rather than using the **Think-Pair-Share** routine for the Launch, read aloud the prompts from Screen 7 and the sentence frames below the patterns and within the Alike and Different table from the Sheet. **Sample responses shown.**

Emerging

Ask, "What happens as you move from one figure to the next in Pattern A?"

Add 4 tiles.

Invite students to use extra think-time to annotate the given figures and table before discussing the questions from Screen 7 with a partner.

Then invite students to use the first set of sentence frames to have a productive and meaningful conversation with their partner. Invite them to speak in their primary language first, or a mixture of their primary language and English. After students have shared their thinking, write out key words that you heard and model how they can use those words and the sentence frames to create a written response in the table. Have students continue to Screen 8 once they have written their responses.

Expanding

Ask, "What happens as you move from one figure to the next in Pattern A?"

4 tiles are added each time.

Invite students to take extra think-time before sharing their thoughts about the questions from Screen 7 with a partner. As partners discuss their thinking, encourage students to annotate the figures or tables, such as with arrows or mathematical notation, and use these visuals as part of their discussion. Invite students to use the first set of sentence frames to help them build on the ideas of their partner and clarify what they are hearing.

Then invite students to work with a partner and use the sentence fames in the table to create written responses. Have students continue to Screen 8 once they have written their responses.

Bridging

Ask, "What happens as you move from one figure to the next in Pattern A?"

The number of tiles increases by 4 each time.

Invite students to discuss the questions from Screen 7 with a partner and write down key words and phrases they hear during the discussion. Suggest that they use the first set of sentence frames to enhance their conversations. Encourage students to build on the thoughts of their partner, ask clarifying questions, and use mathematical vocabulary, such as *increases, grows by,* or *pattern*.

Then invite students to create a written response independently. Encourage them to write their responses *without* using the sentence frames in the table and to create more complex sentences that make connections between the patterns. Have students continue to Screen 8 once they have written their responses.

Pattern C

Pattern A

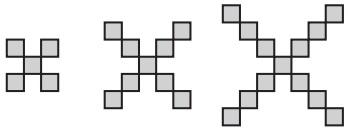


Figure 1 **Figure 2** **Figure 3**

Figure	Number of Tiles
1	5
2	9
3	13
4	17

Pattern B

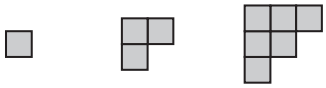


Figure 1 **Figure 2** **Figure 3**

Figure	Number of Tiles
1	1
2	3
3	6
4	10

Here are the two visual patterns we've seen.

How are these patterns alike? How are they different?

Discuss:

Where do you see _____?

Can you show me how _____?

What makes you think _____?

How does that compare to _____?

What I am hearing you say is _____. Is that right?

I want to add that...

In this case, ...

Write:

Alike	Different
In both patterns, ... When you move from one figure to the next, ... Both tables...	The patterns are different because they... Pattern A... Pattern B... Pattern A/B _____, but...

1.02 Activity 1 Sequence Carnival
Introduction to Sequences

EL **Multilingual/English Learners** Use these scaffolds and supports during the **Activity 1, Connect** step to provide more support for your students as they:

- Work toward the language goal in this lesson.
- Interpret **(Reading and Listening)** and communicate **(Speaking and Writing)** using the language from this activity, such as **sequence**, **constant difference**, **constant ratio**, *increasing, decreasing, multiplying, adding, term*.
- Interact in these meaningful ways:

Collaborative	• Exchanging information / ideas	**ELD.PI.9–10.1**
Interpretive	• Listening actively	**ELD.PI.9–10.5**
Productive	• Writing to describe or explain	**ELD.PI.9–10.10**

Spanish Cognates:

English	*constant*	*difference*	*ratio*	*sequence*	*term*
Español	*constante*	*diferencia*	*razón*	*secuencia*	*término*

Materials

Students need access to these additional materials.

In this Resource:

- *Seeing Sequences* Sheet, one per student

Activity 1, Connect

Distribute the *Seeing Sequences* Sheet which has two Frayer Models on them. Invite students to add the definitions for **constant difference** and **constant ratio** to each graphic organizer. Tell students that they may refer back to this sheet as they move through the remaining activities in this unit to find example and non-example sequences, or they may make up their own. Consider pairing English learners who have similar levels of English language proficiency to develop and share ideas about sequences with a constant difference or a constant ratio.

Emerging

Invite students to collaborate with you to complete and discuss the definitions, examples, non-examples, and characteristics of each type of sequence throughout the lesson. Consider providing a word bank as additional support.

Invite students to participate in a group discussion and record their responses on a new shared Frayer Model template for the whole group. Alternatively, invite them to update their responses using their original graphic organizers.

Expanding

Invite students to work with a partner to complete and discuss the definitions, examples, non-examples, and characteristics of each type of sequence throughout the lesson. Consider providing a word bank as additional support.

Invite students to participate in a group discussion and record their responses on a new shared Frayer Model template for the whole group. Alternatively, invite them to update their responses using their original graphic organizers.

Bridging

Invite students to work independently or with a partner to complete and discuss the definitions, examples, non-examples, and characteristics of each type of sequence throughout the lesson.

Invite students to participate in a group discussion and record their responses on a new shared Frayer Model template for the whole group. Alternatively, invite them to update their responses using their original graphic organizers.

Seeing Sequences

Constant ratio

Definition

Characteristics

$\overset{\times 4}{\frown}\ \overset{\times 4}{\frown}\ \overset{\times 4}{\frown}$
$2,\ 8,\ 32,\ 128$

Example/Models

Non-Examples

Constant difference

Definition

Characteristics

$\overset{+6}{\frown}\ \overset{+6}{\frown}\ \overset{+6}{\frown}$
$5,\ 11,\ 17,\ 23$

Example/Models

Non-Examples

Recursion Machine
Recursive Definitions

EL **Multilingual/English Learners** Use these scaffolds and supports during the **Activity 2, Monitor** step to provide more support for your students as they:

- Work toward the language goal in this lesson.
- Interpret **(Reading and Listening)** and communicate **(Speaking and Writing)** using the language from this activity, such as **recursive definition**, *constant difference, constant ratio, sequence*.
- Interact in these meaningful ways:

Collaborative	• Exchanging information / ideas • Offering opinions	**ELD.PI.9–10.1** **ELD.PI.9–10.3**
Interpretive	• Listening actively	**ELD.PI.9–10.5**
Productive	• Supporting opinions • Selecting language resources	**ELD.PI.9–10.11** **ELD.PI.9–10.12**

Spanish Cognates:

English	*definition*	*recursive*	*sequence*	*term*
Español	*definición*	*recursiva*	*sequencia*	*término*

Materials

Students need access to these additional materials.

In this Resource:

- *Recursive Challenges* Sheet (for display)

Activity 2, Monitor

Display the *Recursive Challenges* Sheet and invite students to use it when completing Screen 6. Use the **Think-Pair-Share** routine to support students as they discuss how Troy created his recursive definition in part a.

Sample responses shown.

Emerging

Invite students to use the sentence frames and word bank as a support to write their responses to the question in part b on Screen 6 before they discuss with you or their partner. Allow students to write responses and notes in their primary language first, or in a mixture of their primary language and English.

Ask:

- "What did Troy do well?" **He subtracted 25 from 1.**
- "How do you know Troy's rule has a mistake?" **The fourth term would be -24 but it is 1.**

Expanding

Invite students to use the sentence frames and word bank as a support when discussing the question in part a on Screen 6 with a partner.

Encourage students to ask their partners follow-up questions as they discuss their responses, such as:

- "How did you know _____?"
- "Why might you think that _____?"

Ask:

- "What did Troy do well?" **He subtracted 25 from 1 to get -24.**
- "How do you know Troy's rule has a mistake?" **I know because Troy's fourth term would be -24 but we know it is 1.**
- "What questions could you ask Troy to help him improve on his work?" **What would your fourth term be with your rule? What should it be?**

Bridging

Invite students to use the word bank as needed when discussing Screen 6, but encourage them to discuss and write down their responses *without* using the sentence frames.

Encourage students to ask their partners follow-up questions as they discuss their responses, such as:

- "How did you know _____?"
- "Why might you think that _____?"

Ask:

- "How do you know Troy's rule has a mistake?" **I know because Troy's fourth term would be -24 but we know it is 1.**
- "What questions could you ask Troy to help him improve on his work?" **Using your rule, what would your fourth term be? What do we know should it be? How can you change your rule to get the correct fourth term?**

Recursive Challenges

Troy created this recursive definition by . . . Then he . . .

I think Troy . . . to . . .

First, Troy . . . Then he . . .

Troy can improve his work by . . .

Troy should . . . because . . .

Word bank (Banco de palabras)	
English	**Español**
add	sumar
subtract	restar
divide	dividir
term	término
sequence	sequencia
constant difference	diferencia constanta
constant ratio	proporción constante

See the Sequence
Arithmetic and Geometric Sequences

EL **Multilingual/English Learners** Use these scaffolds and supports during the **Activity 1, Monitor** step to provide more support for your students as they:

- Work toward the language goal in this lesson.
- Interpret **(Reading and Listening)** and communicate **(Speaking and Writing)** using the language from this activity, such as **arithmetic sequence**, **geometric sequence**, *graph, representation, table*.
- Interact in these meaningful ways:

Collaborative	• Exchanging information / ideas • Interacting in written English	**ELD.PI.9–10.1** **ELD.PI.9–10.2**
Interpretive	• Listening actively • Reading closely	**ELD.PI.9–10.5** **ELD.PI.9–10.6**

Spanish Cognates:

English	*arithmetic*	*geometric*	*representation*	*table*	*term*	*sequence*
Español	*aritmético*	*geométrico*	*representación*	*tabla*	*término*	*secuencia*

Materials

Students need access to these additional materials.

In this Resource:

- *Multiple Representations* Sheet, one per student
- *Seeing Sequences* Sheet (from Lesson 2)

Activity 1, Monitor

To support making connections, invite students to add the term **arithmetic sequence** to the constant difference graphic organizer and **geometric sequence** to the constant ratio graphic organizer on the *Seeing Sequences* Sheet. Encourage them to use the Sheet as a reference throughout the activity. Distribute the *Multiple Representations* Sheet and invite students to use it when completing Screen 3. Read aloud the prompt for part a and the provided example for the recursive definition. Ask, "What do the terms *advantage* and *disadvantage* mean?" **Sample responses shown.**

Emerging

Ask (for the table):

- "Where do you see the first term?" **First row. *Students may point to the first row.***
- "Where do you see the constant difference and constant ratio? **From one row to the next. *Students may point going from one row to the next.***

Repeat the above questions for the graph.

Invite students to use the embedded sentence frames to write one advantage and one disadvantage for the table and graph, using simple words or short phrases. Then ask them to discuss their responses with you or a partner. Allow students to write in their primary language first, or in a mixture of their primary language and English.

Invite students to use the sentence frame and collaborate with you to write their response to part b.

Expanding

Invite students to use the embedded sentence frames to write one advantage and one disadvantage for the table and graph, using short sentences. Then ask them to discuss with a partner.

Encourage pairs to ask their partner follow-up questions as they discuss their responses, such as:

- "What can we agree upon?"
- "Based on this conversation, we think _____."

Ask, "When might you prefer to use a graph? A table? A recursive definition?" **A graph when you want to see the shape of the sequence.**

Invite pairs to collaborate to respond to part b, using the sentence frame, as needed.

Bridging

Invite students to independently write one advantage and one disadvantage for the table and graph using complete sentences and *without* using the sentence frames.

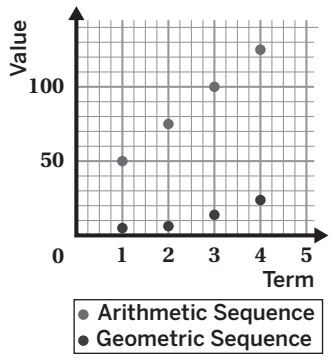
Encourage pairs to ask their partner follow-up questions as they discuss their responses, such as:

- "Would you still want to use that representation if _____?"
- "Which representation might help us more in finding _____?"

Invite students to respond to part b independently *without* using the sentence frame.

Sequence Types

a What are the advantages and disadvantages of each representation?

Representation	Advantages	Disadvantages
First term: 50 Rule: Constant difference of 25 50, 75, 100, 125, ___ First term: 3 Rule: Constant ratio of 2 3, 6, 12, 24, ___	A recursive definition is useful because it shows how a sequence starts and how it changes.	A recursive definition is not as useful when you want to determine what the later terms of the sequence are.
Term | Arithmetic Sequence | Geometric Sequence 1 | 50 | 3 2 | 75 | 6 3 | 100 | 12 4 | 125 | 24	A table is useful because . . .	A table is not as useful . . .
	A graph is useful because . . .	A graph is not as useful . . .

b Choose one representation. Explain how you can use it to help you determine which sequence has the greater 10th term.

The representation I would use to compare the 10th terms would be the recursive definition / table / graph because . . .

Notes

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