Compound Inequalities on the Number Line

CLASS CODE

30-45 minutes | Development

In this activity, students explore compound inequalities and make connections among multiple representations (including algebraic expressions, verbal statements, number line graphs, and solution sets).

RELATED ACTIVITIES

This is the second activity in a series of three. Here are links to the others:

1. Inequalities on the Number Line
https://teacher.desmos.com/activitybuilder/custom/57d9fdc6ebf48f73093807b2

3. Absolute Value Inequalities on the Number Line
https://teacher.desmos.com/activitybuilder/custom/57b8df55301844f605b76506

French translation courtesy of Jocelyn Dagenais:

https://teacher.desmos.com/activitybuilder/custom/58fb73e4cd80a609828f2b58

Activity Checklist

- [ ] Complete the activity using student preview.
- [ ] Identify your learning targets for the activity.
- [ ] Determine the screens where you'll bring the class together using Teacher Pacing and Pause Class. What will you discuss on those screens?
- [ ] Anticipate screens where students will struggle, then plan your response.
- [ ] Plan a challenge for students who finish the activity quickly and successfully.
- [ ] Make yourself available during the activity to students for individual help and questions when appropriate.
- [ ] Write out your summary of the activity's main ideas. How will you pull student work into that summary? Which parts of the activity can you skip to ensure that summary receives sufficient time?

My Learning Targets:

Activity Screens: Teacher Pacing and Pause Class

Use this page to plan your use of Teacher Pacing and Pause Class. Teacher Pacing lets you restrict students to a single screen or a range of screens. Pause Class keeps students from interacting with whatever screens they are currently viewing. Use these two tools to create conversations in your classroom.

Consider these questions as you plan:

- Which screen(s) should everyone work on at the same time? Why?
- Which screen(s) do you want to keep students from seeing until you're ready for the class to see them together? (Perhaps because they reveal answers or require a whole class conversation for introduction.)
- Are there any points in the lesson where you will want to make sure students aren't playing with the screens while you discuss something as a class?

1 Plot a point.

Drag the orange point to a place on the number line indicating a number that

2 Plot another point.

Drag each orange point to ANOTHER place on the number line indicating a

3 Plot one more point.

Drag the orange point to ONE MORE place on the number line

4 Predict #1

What would the graph look like if all

5 Reveal #1

How does the actual graph compare to

6 Plot four points.

Drag each orange point to a place on the number line indicating a number that

7 Predict #2

What would the graph look like if all

8 Reveal #2

How does the actual graph compare to

9 Plot four points.

Drag each orange point to a place on the number line indicating a number that

10 Predict #3

What would the graph look like if all

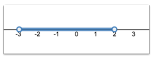
11 Reveal #3

How does the actual graph compare to

12 All the Numbers

Earlier, you and your classmates showed LOTS of numbers that are

13 Compare



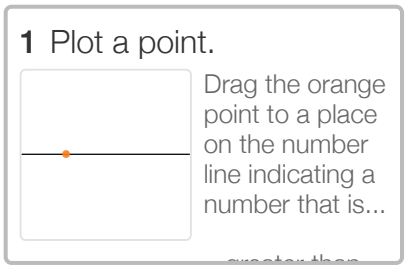
Here is the number line diagram from

14 Open vs Closed

The open dots (above) mean that –3 and 2 aren't included in the solution

15 Sort these cards …

16 Sort these cards …



Drag the orange point to a place on the number line indicating a number that is...

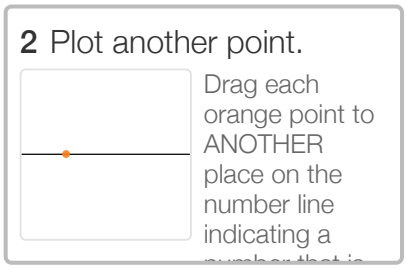
...greater than –3.

Move to the next screen when you're done.

Teacher Tip:

Use "Responses" mode in the teacher dashboard to identify students who may need additional support, both here and on Screens 2-3.

My Notes:



Drag each orange point to ANOTHER place on the number line indicating a number that is...

...greater than –3.

Move to the next screen when you're done.

My Notes:

3 Plot one more point.

Drag the orange point to ONE MORE place on the number line indicating a number that is...

Drag the orange point to ONE MORE place on the number line indicating a number that is...

...greater than –3.

(Place it where you think none of your classmates will.)

My Notes:

4 Predict #1

What would the graph look like if all of your

What would the graph look like if all of your classmates' points were shown along with yours?

Teacher Tip:

On Screen 4, students make a prediction. On Screen 5, they see how their prediction compares to the actual graph.

This cycle of "predict" and then "verify" (which also occurs on Screens 7-8 and 10-11) is a key point in the development of the activity.

Spend some time highlighting several student responses for the class. Start with informal math language and reasoning, then move to more formal responses.

Sample Answer: "All the points should be to the right of –3."

My Notes:

5 Reveal #1

How does the actual graph compare to

How does the actual graph compare to your prediction?

Teacher Tip:

Again, highlight several student responses for the class, this time to draw out the differences between their predictions and what they actually saw.

My Notes:

6 Plot four points.

Drag each orange point to a place on the number line indicating a number that is...

Drag each orange point to a place on the number line indicating a number that is...

...greater than –3 AND less than 2.

(Place one where you think none of your classmates will.)

Teacher Tip:

Use "Responses" mode in the teacher dashboard to identify students who may need additional support.

My Notes:

7 Predict #2

What would the graph look like if all of your

What would the graph look like if all of your classmates' points were shown along with yours?

Teacher Tip:

Highlight several student responses for the class. Start with informal math language and reasoning, then move to more formal responses.

Sample Answer: "The points will be in between –3 and 2."

My Notes:

8 Reveal #2

How does the actual graph compare to

How does the actual graph compare to your prediction?

Teacher Tip:

Again, highlight several student responses for the class, this time to draw out the differences between their predictions and what they actually saw.

My Notes:

9 Plot four points.

Drag each orange point to a place on the number line indicating a number that is...

Drag each orange point to a place on the number line indicating a number that is...

...less than –3 OR greater than 2.

(Place one where you think none of your classmates will.)

Teacher Tip:

Use "Responses" mode in the teacher dashboard to identify students who may need additional support.

My Notes:

10 Predict #3

What would the graph look like if all of your

What would the graph look like if all of your classmates' points were shown along with yours?

Teacher Tip:

Highlight several student responses for the class. Start with informal math language and reasoning, then move to more formal responses.

Sample Answer: "Some of the points will be to the left of –3. The rest of the points will be to the right of 2."

My Notes:

11 Reveal #3

How does the actual graph compare to

How does the actual graph compare to your prediction?

Teacher Tip:

Again, highlight several student responses for the class, this time to draw out the differences between their predictions and what they actually saw.

My Notes:

12 All the Numbers

Earlier, you and your classmates showed LOTS of numbers that are greater than –3 AND less

Earlier, you and your classmates showed LOTS of numbers that are greater than –3 AND less than 2.

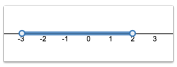
If you wanted to show ALL such numbers, you would shade the number line like this.

Move on to the next screen.

My Notes:

13 Compare

Here is the number line diagram from



Here is the number line diagram from the previous screen, along with another (very similar) diagram.

How are the diagrams similar? How are they different?

Teacher Tip:

Sample Answer: The top graph has empty/open circles. The bottom graph has filled-in/closed circles.

My Notes:

14 Open vs Closed

The open dots (above) mean that –3 and 2 aren't included in the solution set.

The open dots (above) mean that –3 and 2 aren't included in the solution set.

The closed dots (below) mean that they are.

Move to the next screen.

Teacher Tip:

Success on the following screens depends on students understanding this subtle-yet-meaningful distinction.

My Notes:

15 Sort these cards into…

Teacher Tip:

Use the teacher dashboard to monitor student progress, and to look for common sorting strategies. The dashboard may also help you pair students together for conversations about how they sorted the cards.

Make sure you complete this card sort yourself, in the role of a student, to acquaint yourself with the cards, questions, and conceptions that may arise in class.

My Notes:

16 Sort these cards into…

Teacher Tip:

Use the teacher dashboard to monitor student progress, and to look for common sorting strategies. The dashboard may also help you pair students together for conversations about how they sorted the cards.

Make sure you complete this card sort yourself, in the role of a student, to acquaint yourself with the cards, questions, and conceptions that may arise in class.

My Notes:

Summary Notes: