

You're the Network

Data Analysis

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Grade Level	8th – 9th Grade	**Time Frame**	2 class periods
Subject	Mathematics		
Course	Algebra 1		

Essential Question

How can we use scatter plots to make decisions?

Summary

Students will investigate the episode rating data for the "American Idol" TV series as they learn how to describe scatter plots using academic language. Students will create and analyze scatter plots, considering how one could use scatter plots to make decisions. Sketching a trend line (or line of fit) by hand is a prerequisite for this lesson.

Snapshot

Engage

Students make observations about a given scatter plot and consider how one could use the graph to make decisions.

Explore

Students examine the scatter plot more closely and attempt to describe the trend.

Explain

Students solidify their vocabulary for describing trends in scatter plots and consider how an outlier may impact their description.

Extend

Pairs create and describe scatter plots, with trend lines, for the individual seasons of *American Idol* and then for the overall TV series.

Evaluate

Students create a scatter plot based on a given description.

Standards

ACT College and Career Readiness Standards - Mathematics (6-12)

A603: Match linear inequalities with their graphs on the number line

Oklahoma Academic Standards Mathematics (Algebra 1)

A1.D.1.2: Collect data and analyze scatter plots for patterns, linearity, and outliers.

Attachments

- Guided Notes—You're the Network - Spanish.docx
- Guided Notes—You're the Network - Spanish.pdf
- Guided Notes—You're the Network.docx
- Guided Notes—You're the Network.pdf
- The Data—You're the Network - Spanish.docx
- The Data—You're the Network - Spanish.pdf
- The Data—You're the Network.docx
- The Data—You're the Network.pdf
- The Final Judgment—You're the Network - Spanish.docx
- The Final Judgment—You're the Network - Spanish.pdf
- The Final Judgment—You're the Network.docx
- The Final Judgment—You're the Network.pdf
- The Graphs (Key)—You're the Network.docx
- The Graphs (Key)—You're the Network.pdf
- The Graphs—You're the Network.docx
- The Graphs—You're the Network.pdf

Materials

- Guided Notes handout (attached; one per student; print two-sided)
- The Data handout (attached; one per pair; print one-sided)
- The Graphs handout (attached; one per pair; print one-sided)
- The Graphs (Key) document (attached)
- The Final Judgement handout (attached; one per pair; print one-sided)
- String or Yarn (class size will determine length; see Extend below)
- Coloring utensils (optional)
- Clear tape
- Marker (one)
- Student devices with internet access

Preparation

To prepare for the Amplify Classroom activity in this lesson, go to *Amplify Classroom: You're the Network*. Sign up to create an account or log in. Select the “Assign” dropdown button, and then select “Create single session code.” Adjust the settings as desired, then select “Create Invite Code.” Prepare this session invitation code to distribute to students during the lesson. For help assigning an Amplify Classroom activity, see k20.ou.edu/AssignActivity.

For more information about getting started with Amplify Classroom, go to k20.ou.edu/StartAmplify.

To set up the activity’s pacing for students, select the “Teach" button in the same row as the corresponding session code. In the resulting pop-up window, copy the session code if needed. Close the pop up. In the upper-left corner of your screen, select the “Pace” icon. Follow Amplify’s prompts to select the first and last screens that you want students to see. Here, select screens 1 and 6. Select "Restrict to Screens 1–6" to confirm your selection. This allows students to access only screens 1–6 at this time. For more information about other tools on the teacher dashboard, go to k20.ou.edu/Facilitation.

10 minutes

Engage

Provide students with your session code. Then, have them go to student.amplify.com/join and enter the session code.

Teacher's Note: Sign-in Options

If students sign in with their Google or other account, then their progress automatically saves, and they can resume the activity or view their work later. If students continue without signing in, they can complete the activity, but they must do so in one sitting. It is strongly recommended that students sign in; otherwise, they risk losing their work.

Introduce the lesson using **screens 1–2** of the Amplify Classroom activity. **Screen 1** displays the lesson's essential question. **Screen 2** identifies the lesson's learning objective. Review each of these with students to the extent you feel necessary.

Since this lesson is themed around a competition show, consider playing the role of "host" and reading through the activity directions in an overly dramatic way.

Direct students' attention to **screen 3** and share with students that during this lesson they are going to analyze data from the TV series *American Idol*. Consider reading the information on this screen aloud or have students read it to themselves so that everyone in the class has a little background knowledge of the show.

Have students select the "Next" button and navigate to **screen 4**. Here, they assume the role of data analysts to make observations about the given data. The given data is a scatter plot where x represents the episode number and y represents the average episode rating from the first three seasons of *American Idol*. Again, consider reading the text on the screen and describing the axes aloud. However, do not describe any trends in the scatter plot at this time, as students will be investigating that further later in the lesson.

Teacher's Note: Data Source

Some of the data used for this activity were obtained from RatinGraph.com, which is not affiliated with the *American Idol* television show. As a result, these data points may not represent official or fully accurate episode ratings.

Additionally, data for some episodes are unavailable. For the purposes of this activity, fictional data have been substituted for some missing episode data.

Then direct students to navigate through **screens 5–6**, where they can see the scatter plot of the three seasons of data in more detail, and use the I Notice, I Wonder strategy to answer questions about the graph. Once students select the "Submit" button on screen 6, they are asked, "How do you think you could use a scatter plot to make decisions?"

As you notice most students are completing screen 6, ask for a few volunteers to share what they noticed, then ask for a few volunteers to share what they wonder. If time allows, ask for volunteers to share how they believe they could use a scatter plot to make decisions. Use the shared responses and responses from the Amplify Classroom dashboard as a formative assessment to see what prior knowledge students have about scatter plots. Make note of any misconceptions, but wait to correct them until the Explain phase of the lesson.

15 minutes

Explore

Instruct students to find a partner or assign partners. On the Amplify Classroom dashboard, select the orange plus sign five times to allow students to progress to **screens 7–11**.

Direct pairs to read the information and answer the question on each screen. Each screen gives feedback based on the selected response, so this is a great time to circulate the room and answer questions. During this portion of the lesson, students are informally introduced to the ideas of *direction*, *form*, *strength*, and *outliers* as ways to describe or analyze scatter plots.

On screen 11, students are asked to consider how their description might change if the outliers were removed. As you notice most students completing this screen, bring the class together for a brief discussion about the impact of removing outliers and how that impact could be anywhere from a lot to none, depending on the set of data.

20 minutes

Explain

Select the orange plus sign on the Amplify Classroom dashboard once to allow students to progress to **screen 12**. As students order the graphs from having the strongest to weakest association, distribute a copy of the attached **Guided Notes** handout to each student.

On the Amplify Classroom dashboard, select the orange plus sign once to allow students to progress to **screen 13**. Use this screen to guide students in understanding that the first step in describing scatter plots is identifying *direction*. Students should determine whether there is a positive, negative, or no association between *x* and *y*. Encourage students to add notes to the front side of their handout. Consider giving students coloring utensils, as these notes were designed for students to engage with.

Select the orange plus sign on the Amplify Classroom dashboard once to allow students to progress to **screen 14**. Use this screen to help students understand that once they have determined that there is an association, the next detail to determine is the *form*. They need to decide if the trend is linear or nonlinear.

On the Amplify Classroom dashboard, select the orange plus sign once to allow students to progress to **screen 15**. Use this screen to help students understand that after they know whether the association is linear or nonlinear, they need to determine the *strength*. They need to decide if the association is strong, moderate, or weak.

Select the orange plus sign on the Amplify Classroom dashboard once to allow students to progress to **screen 16**. Use this screen to help students understand that outliers are those points that do not seem to fit the pattern of the rest of the data.

On the Amplify Classroom dashboard, select the orange plus sign once to allow students to progress to **screen 17**. Direct students' attention to the back of their handout and introduce them to "Contestant #1" (the first example). Ask students guiding questions, but have them describe the first scatter plot using what they have learned. Students can type in their response for feedback in the Amplify Classroom activity or just take notes on their handout; either is fine, but clearly communicate with students your expectations.

Select the orange plus sign on the Amplify Classroom dashboard twice to allow students to progress to **screens 18–19**. Have students use the Amplify Classroom activity to complete their notes. Here, students should type their response, use the sketch tool to circle the outlier, and then get feedback about the correct description for each scatter plot (contestant).

Once finished, have students add this handout to their math notebook if that is a classroom norm.

40 minutes

Extend

Teacher's Note: Extend Activity Preparation

During this phase of the lesson, pairs are going to plot individual seasons of *American Idol* data, describe scatter plots, create a trend line for their season of data, and then attach all of their graphs together to, as a class, create a trend line for all of the data.

Each pair will need one page of the attached **The Data** handout, which is a 23-page document where the data for each season is on the corresponding page number. If you have 15 pairs of students, print pages 1–15 for pairs to use data from Seasons 1–15. Or consider printing pages 1–16 and use Season 1 (or any season in that set) as a model, and have the 15 pairs use the other 15 pages.

Then, print the corresponding pages of the attached **The Graphs** handout, which is also a 23-page document where the blank graphs are labeled and customized for each season. The vertical dashed lines on these pages are for students to fold along those lines so that when they line up all of their graphs together, they fit seamlessly.

Depending on the quantity of pages/seasons will determine the length of string or yarn needed. Once pairs put all of their graphs together, two students will need to hold the ends of the string to estimate the overall trend line. If you have 15 pairs of students, then they have used 15 pages of paper, so you would need approximately 15 feet of string.

You will also need to dedicate space to hang the graphs sequentially together to create one (horizontally long) graph. If limited on space, consider using the hallway to hang graphs.

On the Amplify Classroom dashboard, select the orange plus sign once to allow students to progress to **screen 20**. This screen gives a brief overview of the activity and indicates that students are to set aside their Amplify Classroom activity to complete the following activity.

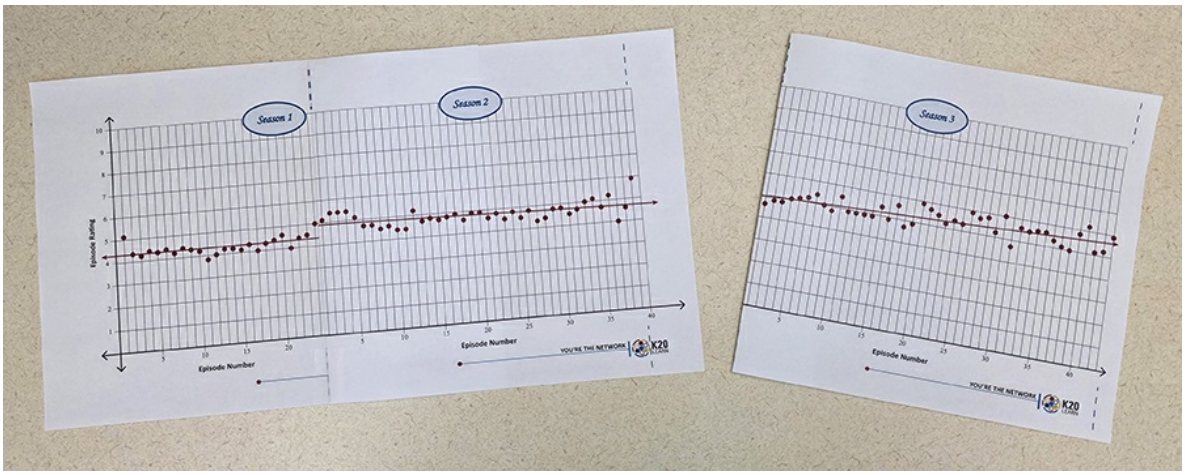
Have students find a new partner or continue working with their partner from before. Give each pair one page from the attached **The Data** handout and the corresponding page from the attached **The Graphs** handout. Direct pairs to follow the directions on the handout and use the given data to create a scatter plot.

As pairs are finishing their scatter plots, give each pair a copy of the attached **The Final Judgment** handout. Here, students are asked to describe their scatter plot and then three other scatter plots. Pairs who finish early can go ahead and describe their own. Once everyone has finished their scatter plots, have students make their scatter plots easily visible on their desks (possibly clearing their desks of other things) and have students visit other desks to describe three other scatter plots. Students are also asked to make a decision about each season. Should the network renew the show? Why or why not?

After approximately 5 minutes or when students are finished, have them return to their scatter plots. Give each pair a ruler and have them sketch a line of fit.

As time allows, ask for volunteers to share their descriptions for a selected season with the class. Use the attached **The Graphs (Key)** document as needed.

When students are done, have them fold their paper along the left vertical dashed line (there are two of these lines) such that their *y*-axis is now behind their scatter plot. Then direct the pair with Season 2 to align their fold with the vertical line of Season 1 and tape the seasons together. Have pairs repeat this until all of the seasons are connected and the graph is easily visible to the class (i.e., hung on the wall).



Now have two students hold the ends of the string and have the class help determine how they should hold the string to represent the best-fit line. Once the class is satisfied with the placement of the string, use a marker to draw the trend line across the pages.

Then ask the class, “How could a network use these scatter plots to make decisions? And what decision(s) would you make?” As volunteers share, encourage them to use the academic language they learned during this lesson.

5 minutes

Evaluate

On the Amplify Classroom dashboard, select the orange "Stop" button; this allows students to complete the rest of the Amplify Classroom activity at their own pace.

Have students return to their Amplify Classroom activity and direct their attention to **screen 21**. Here, students are given a description and are asked to create a scatter plot that matches the description. Direct students to drag the points from the origin to represent the data from the first nine episodes of the new show, *Beat the Beat*, to have a positive, linear, and strong trend without any outliers.

Teacher's Note: Managing the Teacher Dashboard

The activity is set up to check for a correlation coefficient greater than 0.75 and that all of the points have an x-value greater than zero. If those conditions are met, a checkmark will display on the Amplify Classroom dashboard for that student. Please keep in mind that this does not account for outliers, so you will still need to check for outliers. But this information can still serve as a quick formative assessment.

Resources

- Eike, M. (n.d.). *You're the network* [Interactive activity]. Amplify Classroom. https://classroom.amplify.com/activity/690a5b85fe9e5d2083ca65e0?checkAmplifyLogin=true&collections=6058d39e867dd93b9a98d722
- K20 Center. (n.d.). Amplify classroom. Tech Tools. https://learn.k20center.ou.edu/tech-tool/1081
- K20 Center. (n.d.). I notice, I wonder. Strategies. https://learn.k20center.ou.edu/strategy/180
- RatinGraph. (1970, January 1). *American Idol ratings (TV show, 2002-)*. Episodes average rating. https://www.ratingraph.com/tv-shows/american-idol-ratings-14588/
- American Idol. (2002). *American Idol* [Logo]. Wikimedia Commons. https://commons.wikimedia.org/wiki/File:American_Idol_logo.svg