Breaking Down a Mathematics Standard

Statistics & Probability

KAS: KY.HS.SP.6

What is the domain/conceptual category/big idea?

Standards for Mathematical Practice

MP.1. Make sense of problems and persevere in solving them.	MP.5. Use appropriate tools strategically.
MP.2. Reason abstractly and quantitatively.	MP.6. Attend to precision.
MP.3. Construct viable arguments and critique the reasoning of others.	MP.7. Look for and make use of structure.
MP.4. Model with mathematics.	MP.8. Look for and express regularity in repeated reasoning.

Cluster: What is the broader understanding that the standard plays a role in building? Summarize, represent & interpret data on two categorical & quantitative variables

Standards

- Identify the target of the standard:
  - o conceptual understanding
  - o procedural skill/fluency
  - o application

Procedures really work to support the application involved here. Students apply procedures to gain a deeper understanding of the context.

Consider how the target of the standard will have an impact on instruction and assessment. (For more information, refer to p. 7, 10 and 15 of *KAS for Mathematics*.) Application: Students are offered a valuable context for learning & the opportunity to solve problems in a relevant & meaningful way. Students learn to select an efficient method to find a solution, determine whether the solution(s) makes sense by reasoning & develop critical thinking skills.

- What key mathematics should students know and be able to do?

-represent data on a scatterplot (2 quantitative variables)
-describe the relationship between explanatory & response variables
-solve problems in the context of the data
  - given a model
  - selecting/calculating appropriate model
-informally assess the fit of a model
  - correlation (linear)
  - plotting/calculating/analyzing residuals

Clarifications

- What are the specific representations/strategies that will need to be considered when planning instruction? • Students should investigate contexts that require them to select/calculate/assess the fit of various models → linear, quadratic, exponential "residual" will be new vocabulary for students (see residual plot in clarifications) → key characteristics of residual plots
- What are the possible misconceptions that will need to be addressed during instruction?
  - mix ups with explanatory & response variables
  - sometimes "obvious" patterns don't tell the whole story & can be misleading
  - misunderstanding/misuse of correlation
  - models are approximations (not perfect) → be careful with predictions/interpretations

Coherence: Previous Grade → Current Standard → Upcoming Grade

- How does this standard build off of prior learning? In Grade 8 → Students have seen scatterplots and informally fit a model to data, but the scope of these models was mainly linear v. nonlinear.
- How does this standard support future learning? Throughout high school → as students explore various types of relationships, they can use these techniques to investigate those relationships in realistic contexts.
- How does this standard connect to other standards (or even other clusters or domains)? Conceptual Categories: Algebra & Functions → As students build/extend their understanding of linear, quadratic & exponential relationships KY.HS.SP.7 & KY.HS.SP.8 also

Attending to the Standards for Mathematical Practice

- How are students engaging in the mathematical practices as they learn this content? (For more information, refer to p. 12-15 of *KAS for Mathematics*.)

MP.3 → Using an appropriate model, students draw and discuss conclusions about a statistical question.
MP.4 → Students interpret their results in context and reflect on whether the results make sense, revising the model if needed.
MP.5 → Students informally determine whether a selected model is appropriate for a set of data & use technology when appropriate to do so.