Digging into Data with TinkerPlots

Design Sample; November 3, 2006
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<th>Name(s)</th>
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Section 2 Attributes and Ratios: Surveying Data

2.1 Introducing Survey Data

2.2 Visualizing Distributions
   Name the Mystery Attributes

2.2 Comparing Two Attributes
   Sports Time and Phone Time

2.4 Extending Comparison of Two Groups
   Males and Females Talking on the Telephone

2.5 Analyzing Class Data
   Investigate Your Own Data

2.6 Introducing Box Plots
   Transform Line Plots into Box Plots

2.7 Comparing Box Plots
   Body Lengths and TV Time

2.8 Comparing Three Groups
   Homework Time Across Grades

Section 3 [Using Formulas: Comparing Data about Signatures]

3.1 Introduction to the Signatures Data Set

3.2 Using Formulas: How do Two Kinds of Signatures Compare?

3.3 Compare Male and Female Signatures With Percentages and Formulas

3.4 Analyzing Data About a Group: How Did the Class do on the Assignment?

3.5 Compare Word Counts for Males and Females

3.6 Is There a Relationship Between the Length of Students’ Conclusions and Their Grades?

Section 4 Measures of Center and Histograms: Analyzing Safety Data

4.1 Introduction to the Data Set: Scooter Injury Reports

4.2 Analyze and Summarize the Data on Scooter Injuries
Section 5

Background Information for Data Sets

In this sequence of lessons, students will be investigating data about people who were injured riding scooters (non-powered scooters) and from fireworks. The data was collected by a government agency called the Consumer Product Safety Commission (www.cpsc.gov). This agency’s goal is to reduce the number of injuries and deaths related to consumer products, such as sports equipment.

OBJECTIVES

Understanding Attributes and Distributions

- Distinguishing between quantitative attributes and categorical attributes (Lesson X.X)
- Identifying which attributes to analyze in order to investigate a particular question
- Identifying individual cases that have particular attributes
- Recognizing the value of analyzing multiple attributes in order to get a fuller picture of the data
- Describing and interpreting the shapes of distributions
- Reasoning about what the shapes of distributions might be for different attributes

Analyzing Data

- Distinguishing between quantitative attributes and categorical attributes (Lesson X.X)
- Identifying which attributes to analyze in order to investigate a particular question
- Recognizing the value of analyzing multiple attributes in order to get a fuller picture of the data
• Describing and interpreting the shapes of distributions
• Reasoning about what the shapes of distributions might be for different attributes

**Communicating About Data**

• Distinguishing between quantitative attributes and categorical attributes (Lesson X.X)
• Identifying which attributes to analyze in order to investigate a particular question
• Identifying individual cases that have particular attributes
• Describing and interpreting the shapes of distributions

**Applications of Math Concepts for Other Strands**

These lessons provide opportunities for students to apply the following middle school mathematics concepts:

• Percentages
• Ratios
• Decimals

**SAFETY DATA**

In this sequence of lessons, students will be investigating data about people who were injured riding scooters (non-powered scooters) and from fireworks. The data was collected by a government agency called the Consumer Product Safety Commission (www.cpsc.gov). This agency’s goal is to reduce the number of injuries and deaths related to consumer products, such as sports equipment.

The agency runs a National Electronic Injury Surveillance System (NEISS) at 100 hospital emergency rooms across the U.S. They collect data on patients that are treated in these emergency rooms for injuries that are associated with consumer products. The Consumer Product Safety Commission uses the injury data:

• To try to prevent similar accidents from happening
• To educate consumers about ways to use products more safely
• To recommend safety standards to the companies that make the products

2p clearance
Introduction to Data Analysis

OVERVIEW

This lesson is designed to help students begin to make the transition from looking at individual cases to thinking about the group of cats.

This activity has a lot of structure in order to build students’ repertoire of ways to make comparisons. In field-testing, we found that some students were satisfied after comparing the data in just one way. We want them to experience a variety of ways and to recognize that this will give them a fuller picture of the data. In later lessons, students will have the opportunity to apply these methods in more open-ended investigations.

If you would prefer to use a less structured approach, you can pose the question and ask students to come up with their own methods of making comparisons. If students do not come up with the methods in the lesson, then you can introduce them.

Objectives

• To connect to students’ prior knowledge about data analysis
• To introduce the data analysis process
• To introduce the term “attribute” and to distinguish between quantitative and categorical attributes

Student Audience: grade 6–7

Class Time: 50 minutes

Materials

• To introduce the data analysis process
• To introduce the data analysis process

Data Set: 50 female cats: Cats50.tp

TinkerPlots Skills: Displaying two attributes at one time, dividers, percentages, counts

Assessment Notes: If you would prefer to use a less structured approach, you can pose the question and ask students to come up with their own methods of making comparisons. If students do not come up with the methods in the lesson, then you can introduce them.
**Introduction**

1. Begin the lesson by eliciting students’ prior knowledge about data analysis. Ask students to come up with ideas to answer the question: Why do people collect and analyze data?

   Alternatively, you may want to begin the lesson by making a KWL chart about data analysis: Ask the class to generate a list of things that they know about data analysis and then a list of things that they would like to learn.

2. Discussion: Have students demonstrate how they found the answers to some of the questions that have two attributes. It’s helpful to have students show different ways to plot the data to find the answer to the same question. Then, have one or two students pose their questions and have the class find the answers.

   - How did you plot the data to find the cats?
   - What other ways could you plot the data to find the cats? What questions did you come up with?

**Exploration**

3. In the second part of the activity, students need to find a subgroup of cats that are typical of the group of 50 cats. This is a shift from looking for individual cats that “stand out” to looking for a small group of cats that are “middle of the road.” Introduce how to use the dividers to select a “center clump” of cats with typical weights.

   The concept of a center clump may be initially confusing to some students. As they continue working with this concept in subsequent lessons, they will build their understanding. Point out that there is not one right answer different students may position the center clump in different places.

   If students are having difficulty getting started, here are some suggestions:

   - Ask students: “Where is the center of the data? Are there a cluster of points around the center?”
   - Suggest that students use the median feature to identify the middle values.
**Introduction to Data Analysis**

**Lesson Notes**

continued

- Suggest that students use the percentage feature to try to find the middle 50% of the data.
- Suggest that students try to position the center clump so that there.

**Wrap-Up**

4. Students create their own plots and analyze the data. They draw a sketch of a plot that they found helpful and write their conclusions. I found that my students loved talking about their own injuries. I set some discussion guidelines so that students would not describe their injuries in gory detail.

a. Enter the units for the attribute in the Units column: mm/letter.

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**What's the Mystery Attribute?**

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Name of Cat(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Looking at One Attribute</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Example: What is the heaviest weight?</td>
<td>13 lbs</td>
<td>Chelsea</td>
</tr>
<tr>
<td>1. What weight?</td>
<td>13 inches</td>
<td>Fuzzy</td>
</tr>
<tr>
<td>2. What is the longest tail length?</td>
<td>12 inches</td>
<td>Keiko, Blacky</td>
</tr>
<tr>
<td>Looking at Two Attributes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. What is the weight of the lightest male cat?</td>
<td>5 lbs</td>
<td>Gray, Ashes</td>
</tr>
<tr>
<td>5. What is the tail length of the heaviest cat?</td>
<td>11 inches</td>
<td>Chelsea</td>
</tr>
<tr>
<td>6. Write your own question.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What is the eye color of the lightest female cat?</td>
<td>Green</td>
<td>Fuzzy</td>
</tr>
</tbody>
</table>

---

**ANSWERS**

- Suggest that students use the percentage feature to try to find the middle 50% of the data.
- Suggest that students try to position the center clump so that there.
Is Chubbs Really Chubby?

1. Example Student Hypotheses: (Note: Spelling and grammar have not been corrected.)

   Females tend to be heavier.

   Yu-Wei: I think female cats are going to weigh more because other animals females are usually heavier than males.

   Evan: I think that female cats tend to weigh more because they are the gender that have babies.

   Males tend to be heavier.

   Tamara: I think that the males are going to be heavier because they then to be more lazy. Also I have a brother and sister and the male is 8 pound heavier.

   Jaeiene: I think that male cats tend to weigh more than female cats because usually males eat more than females and are bigger than females.

2.–3. Example student work:

   Marisa: My conclusion is that male cats weigh more than female cats. Isn’t that right, Christina? The overall average, or mean, for male cats is 2.9 pounds more than the female mean. The median for the male cats is 2.7 pounds more than the female median. The range for the male cats is 4.5 pounds more than the female range. The cat with the smallest weight is a female, while the cat with the largest weight is a male. In conclusion, I believe that male cats weigh more than female cats.

   Christina M.: You are correct Marisa. I came to the same conclusion. The reasons are: 1. The average of male cats, 11.135 lbs., is higher than average of females which is 8.445 lbs. 2. Median of male cats which is 10.875 pounds is higher than female cats’ median, 8 pounds. 3. The heaviest cat is male (21 pounds), and the lightest cat is females (2 pounds). 4. Mode of males (12 lbs.) is higher than females’ (8 lbs.)

   Average of all cats is 9.79 pounds. Out of 48 cats who’s weight is over the average, 34 of them are males. Looking at these reasons, you can conclude that males weigh more than females.
4. a. This is a helpful plot for finding Chubbs. It shows two attributes: body length on the x-axis and gender is shown by color. Chubbs is the only male cat with a body length of 22.

b. Chubbs is case #12. This is his data card and all attributes and corresponding values. Take a gander at the name, gender and everything else a student would need to analyse the information is TinkerPlots.
c. Some students stacked the weight data horizontally and ordered it from lightest to heaviest. This shows that Chubbs is in the middle of the weights.

d. Some students found that Chubbs was one of the longest cats. The combination of the two plots shows that Chubbs has a medium weight, so he is not chubby.

Some students made a line plot of the weight data. They used the median and mean features. This shows that Chubbs has the median weight for this group of cats.

By making a similar graph for body length, students found that Chubbs was much longer than the average.

35. See the example student work on page 9. In the data card, double-click `<new attribute>` and type `Letter_Length`. 
**Introduction to Data Analysis**

**Student Example Title**

- Most injuries are eye injuries.
- 10-20 yards is the most common age to get injured.
- Most injuries are made by rockets.
- After eye injuries, hand and finger injuries are most common.
- Eye injuries are most dangerous.
- 52% of injuries are to the eye.
- 28% of injuries are to the hand and fingers.
- 10% of injuries are to the face.

---

[SE Art] center art set in 50p8 height x 41p width. Letter sized art should be reduced averaging 80%. Otherwise, graphic should be as large as possible to fit frame.
12. Write Your Conclusions: Do female cats tend to weigh more than male cats?

My conclusion is that male cats weigh more than female cats.

The cluster of most common numbers for males was higher on the chart. The males had 68% of them above the average weight, while only 28% of the females were above average. The most common weight or mode of the females was 8 pounds, while the mode for males was 17 pounds. Also, many more males than females were above 10 pounds. The difference between the mean of the males and females was a full two pounds: males were 10.8, females 8.8. All of this evidence put together is sufficient for me to think that male cats are generally heavier than female cats.
1. Why do people collect and analyze data? Come up with 2 reasons.

2. People use data analysis to investigate different kinds of questions. Fill in the table with example questions that you would like to find out about your school.

<table>
<thead>
<tr>
<th>Kind of Question</th>
<th>Example Questions about Your School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe and summarize</td>
<td>• How much time do students spend on the internet on a typical school night?</td>
</tr>
<tr>
<td>Make comparisons</td>
<td>• How does the amount of time 6th grade students spend on homework compare to 8th graders?</td>
</tr>
<tr>
<td>Explore relationships</td>
<td>• Is there a relationship between the amount of time students sleep and their grades.</td>
</tr>
<tr>
<td>Make decisions and</td>
<td>• Which day of the week do you recommend scheduling a school event so that many parents can attend?</td>
</tr>
<tr>
<td>recommendations</td>
<td></td>
</tr>
</tbody>
</table>
The process of investigating data involves these parts:

A. Ask the Question
B. Make a Hypothesis
C. Collect Data
D. Analyze Data/Interpret Findings
E. Communicate Conclusions

How would you use this process to investigate an example question? Fill out the table.

**Ask the Question**

1. **What question do you want to investigate?** Choose an example question from page 1.

**Make a Hypothesis**

2. **What is your hypothesis?** What do you think the data will show?

**Collect Data**

What kinds of information do you need? How would you collect the data?

**Analyze Data**

What kinds of evidence would you look for? How would you analyze the data?

**Communicate Conclusions**

How would you tell people about your findings?
What’s the Mystery Attribute?

You will: Compare an individual case to a group of cases.

Data set: 20 one-year-old cats, Cats1.tp

In this activity, you’ll make plots that help you answer the questions in the table.

1. Find the cat named Chubbs by using the information below. Fill in the blanks.

Try to find Chubbs by making a plot and not by going through the data cards, one at a time.

Chubbs is a male cat.

His body length is 22 inches.

Chubbs weighs _____ lbs.

2. Analyze the Data to find out: Is Chubbs chubby compared to this group of cats?

a. Which attribute or attributes will you plot? Circle your choices.

name  gender  weight  body length  tail length  eye color

b. Draw a copy of a plot that you found particularly helpful. Draw an arrow to show where Chubbs is on the plot.
3. Communicate Conclusions: Is Chubbs chubby compared to this group of cats?

My conclusion is that Chubbs ________________, because

4. Think about the four people you read about and how they got injured. In the next lesson, you will be working with a data set of 28 people who got scooter injuries. Make a prediction about that data set. Which person do you think is most typical of the group of people who have gotten scooter injuries? Circle your choice.

1. Eight-year-old female
2. Ten-year-old male
3. 41-year-old female
You will: Make visual and numeric comparisons

Data set: 132 middle school students estimated the time they spent on different activities:

Do middle school students tend to spend more time talking on the phone or playing sports?

Question: Do middle school students tend to spend more time talking on the phone or playing sports?

Example

1. What do you think the data will show? Why?

COLLECT DATA

2. The data has already been collected for you. Students took a survey in which they estimated their time on different activities by using the table below. Add your data to the table below.
**What's the Mystery Attribute?**

**ANALYZE DATA**

3. In other lessons, you were able to compare two attributes on one plot. In this activity, you need to create two plots to compare.

a. Make a line plot for one attribute: 

b. Go to the Edit menu and select Duplicate Plot (or press Ctrl + D).

c. Select the Key and turn on the Lock so that the colors will not change.

4. What do you think will happen to the mean and median if you remove the data for the 41-year-old? Circle your choices.

The mean will **Stay the same**  **Go up**  **Go down**

The median will **Stay the same**  **Go up**  **Go down**
What’s the Mystery Attribute?

COMMUNICATE CONCLUSIONS

5. Make visual comparisons

Example

Here are two examples of where students put the dividers:

Anna: I think there is a center clump of weights between 7 and 9 pounds.

Tony: I noticed a cluster between 8 and 9.5.
6. Your dominant hand is the one you usually use. Which hand do you use to write? 

\[ \text{Right } \quad \text{Left} \]

The first data set you explore, One Year Old Cats.tp, contains information about 20 one-year-old cats. Using TinkerPlots, you can separate, sort, and display data in different ways to find cats with particular characteristics.

7. Open the file **One Year Old Cats.tp** to see a data set of 100 cats of different ages. You can use TinkerPlots to create a new attribute that will calculate the ratio of cats’ tail lengths to their body lengths. Let’s call the new attribute: \( \text{Tail_to_Body} \).

For example, Hanna has a tail length of 6 inches and a body length of 12 inches. What is her \( \text{Tail_to_Body} \) ratio?

\[
\text{Tail_to_Body} = \frac{\text{Tail Length}}{\text{Body length}} = \frac{6 \text{ inches}}{12 \text{ inches}} = 0.5
\]

Follow these steps to make the formula for \( \text{Tail_to_Body} \).
8. Make plots that help you answer the questions in the table. Note: There may be more than one cat for an answer.

Enter 4 and click OK. The line plot will be divided into four equal-width sections.

Step 2 In the Attribute column of the data card, double-click `<new attribute>` and type *Tail_to_Body*. 
# Relationship between Word Count and Grades

<table>
<thead>
<tr>
<th>High Quality</th>
<th>Needs Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gives strong and specific evidence</td>
<td>Does not give evidence to support conclusions</td>
</tr>
<tr>
<td>Gives a variety of evidence</td>
<td>Gives one kind of evidence</td>
</tr>
<tr>
<td>Conclusions are clear</td>
<td>Conclusions are confusing; doesn’t use mathematical terms</td>
</tr>
<tr>
<td>Explains what the findings mean in the context of the data</td>
<td>Does not explain what numbers and measures mean in context of data</td>
</tr>
<tr>
<td>Describes the relationship between the two attributes across the group of students</td>
<td>Focuses only on individual students and not on the group</td>
</tr>
</tbody>
</table>

**Total Rubric Score:** ___________ points out of 20.
Data Analysis Vocabulary

ATTRIBUTE

Definition: [SAB1]

Examples:
Numerical Attributes
Categorical Attributes

LINE PLOT

Definition

Example

What do you need to remember for making and interpreting line plots? Make a check list.
Master Font List for Math symbols:

- $\chi$: ItalSymb (Symbol Italic)
- $\mu$: Minion italic
- $\sigma$: Mathematical Pi Italic
- $\alpha$: Mathematical Pi Italic
- $\beta$: Mathematical Pi Italic
- $\approx$: Mathematical Pi One
- $\varepsilon$: ItalSymb (Symbol Italic)
- $\Sigma$: Symbol

Operational signs:

- $\cdot$ (mult.dot): 14 pt. MathPiOne Bold Key, baseline shift -1
- $\leq$ or $\geq$: MathematicalPi OneKey

$+ - \times \div \equiv \approx \pm \leq \geq \neq$ (all rest of operational signs)* Mathematical Pi font family

*Note: When typesetting with Letter Gothic font (used for stemplots, summary statistics, or to imitate computer text) or TI-83 calculator font make all characters/symbols/operational signs the text font (not MathPi) whenever possible.

When a line is referred to by the letter name “ell” the keystroke comma in Mathematical Pi 2 should be used. Negative sign is Minus sign. Don’t use the normal raised Negative sign. Degrees–option-shift-8 in the text font. Mathematical Pi Type Fonts should be used for all mathematical signs, symbols, and characters unless noted otherwise.
Type Specifications
Digging into Data with TinkerPlots

Page Specifications

Trim: 8.5" x 11"  
Type Page: Content Area: 41p width x 59p6 height including heads and running foot. Manuscript should never fall below 7p from bottom trim.

Text Pages (SO1, A1, A2, B, BT, BLM2): 41p width x 52p3 height, manuscript, first baseline of ms. sinks 6p9 from trim.

BLM-Student Worksheet: 41p width x 52p3 height, first baseline of ms. sinks 6p9 from trim.

B2-Student Example Contd: 41p width x 50p8 height, first baseline of ms. sinks 8p6 from trim.

SO-Section Opener: 41p width x 51p height, first baseline of ms. sinks 8p from trim.

A-Student Activity: 41p width x 49p2 height, first baseline of ms. sinks 9p10 from trim.

Margins: Top: 3p6; Gutter: 6p6; Bottom: 3 picas; Foredge: 3p6

Typefaces: Minion Family, Stone Sans, Helvetica Neue, Jotting, Math Pi, Symbol, Italic Symbol

Special Instructions
(c) before a type code in these specifications and Design Sample indicates character style.  
Hyphenation is not allowed.

All measurements are from baseline to baseline [b/b] or baseline to top (of table, artwork or cap height of line) [b/t or t/b], unless stated otherwise.

Typeset text following colon [:] with an en space set in between, unless stated otherwise.

Color—100% Black, unless stated otherwise.

StoneSans Bold should be set to semibold not the full weight of bold.

TinkerPlots Art Guidelines

Text wrap for Teacher and Student around art should have a visual space of 1 pica. May need to hand spec wraps and spacing dependent on art’s placement. Allow 1 pica between artwork stacked and/or aligned on horizontal axis; Artwork [Art, ArtR, SArt, SArtR] above and below to allow 1 pica above from base of art of descender of text line/ equation to top of art and 1 pica below base of printed art to ascender of text line/ equation.

Art
Teacher Artwork: Artwork set within text needs to be inline using [Art] style sheet. Centered with right indent of 10p7 in 41p text column.

ArtR
Teacher Artwork, Flush Right: Artwork set within text needs to be inline using [ArtR] style sheet. Flush Right in 41p text column.

SArt
Student Artwork: Artwork set within text needs to be inline using [SArt] style sheet. Centered with right indent of 6p6 in 41p text column; right indent 4p.

SArtR
Student Artwork, Flush Right: Artwork set within text needs to be inline using [SArtR] style sheet. Flush Right in 41p text column.

SE Art
Student Example Art: center art, set in 41p width x 50p8 height—B2 type page. Original art done on letter sized paper should be reduced averaging 80%. Otherwise, graphic should be as large as possible to fit frame.

BLM Art
Blackline Master Art; center art, set in 41p width x 52p3 height—BLM2 type page. Original art done on letter sized paper should be reduced averaging 80%. Otherwise, graphic should be as large as possible to fit frame.

Icons

Section Motifs The five section motif icons (Basketball.eps, Cats.eps, MiddleSchool.eps, Scooters.eps and Signature.eps) is set at 100% and centered within IconFram01.eps. Recto Section Opener, [IconFram01.eps] top sinks 2p5 from top trim and flush right 2p11 from Foredge. Verso Section Opener, [IconFram01.eps] top sinks 2p5 from top trim and flush right 5p10 from spine.

TPicon TinkerPlots icon: Icon’s stem arm is centered to the line-height of the corresponding text. Stem circle is centered in 1p6 gutter to first line; flush right leaving 8 pt of white space.

OFFicon Offline icon: Icon’s stem arm is centered to the line-height of the corresponding text.

Page 1 of 7
Stem circle is centered in 1p6 gutter to first line; flush right leaving 8 pt of white space.

**Tech Art**
See TinkerPlots Art Guide.

**BLM Art**
If Art is to stand alone on page, size image to fit within 41p width x 52p3 height. Otherwise, use Student Art spacing and sizing if it exists with text.

**Running Feet, Folios and Misc**

- **Folio**
  - Folio baseline sits 3p9 above bottom trim.
  - Recto Folio: 9/9 pt ITC Stone Sans Semibold, flush right on 41p.

- **RFV**
  - Running Foot Verso: Book Title: 9/9 pt ITC Stone Sans Medium c/lc x 41p, flush right on type page. First baseline sits 3p9 above bottom trim. Lesson Number and Title (set Em-space after Lesson number to title): 9/9 pt ITC Stone Sans Medium c/lc x 41p c/lc, flush left-align on indent at 2p9.

- **RF Copyright Verso**
  - Running Foot Copyright Verso: 7/9 pt ITC Stone Sans Medium c/lc x 41p, flush right on type page. First baseline sits 3p above bottom trim.

- **RFR**
  - Running Foot Recto: Book Title: 9/9 pt ITC Stone Sans Medium c/lc x 41p flush left on type page. First baseline sits 3p9 above bottom trim. Lesson Number and Title (set Em-space after Lesson number to title): 9/9 pt ITC Stone Sans Medium c/lc, set on right-aligning tab at 38p2.

- **RF Copyright Recto**
  - Running Foot Copyright Recto: 7/9 pt ITC Stone Sans Medium c/lc, flush left on type page. First baseline sits 3p above bottom trim.

- **RSR**
  - Small Rule; 4p6 length, 0.5 pt weight; Set space on each side.

- **RLR**
  - Large rule; 9p6 length, 0.5 pt weight; Set space on each side. InDesign Thin space follows rule between comma.

- **CON**
  - Continued: 9/12pt ITC Stone Sans Medium, lc. When table break to new page set "(continued)" flush right tab at 41p text column width; baseline shift of 5, set at the bottom of the table. Allow 1p1 base of table to baseline of "(continued)". For the continuing break set "(continued)" flush left to the top of the table; tabs sets at 5p, 6p5 and 10p7. Allow p6 baseline to top of table.

**Frontmatter**

- **FM1**
  - Front Matter Section Title: 14/15 pt Helvetica Neue 67 Medium Condensed, c/lc, flush left 4p4 x 41p text column, ragged right. Section Number has En-space following before title. [FM-#] tab set flush right at 36p8. Allow 2p4 b/b to [FM2].

- **FM2**
  - Front Matter Lesson Title: 11/13 pt Helvetica Neue 67 Medium Condensed, c/lc, Numeration flush right at 6p2; Lesson Title flush left at 7p11, turns hang on the same 7p11; [FM-#] tab set flush right at 36p8. Allow 1p4 b/b to [FM-LN].

- **FM-LN**
  - Front Matter Worksheet List: 11/13 pt Helvetica Neue 47 Light Condensed, c/lc, flush left at 9p, ragged right, turns hang on the same. [FM-#] tab set flush right at 36p8. [FM-LN Last] allows 2p2 b/b to [FM2].

**Main Heads**

- **LH1**
  - Lesson Head 1, Major Level Head: 18/19 Helvetica Neue 87 Heavy Condensed, c/lc, align flush left x 41p text column, ragged right. First baseline sits 4p8 from top trim. Rule is offset below x p11, spans 41p; set as 3 pt "Japanese Dots" at 25% black. If [LH1] line length goes beyond 30p, turn into two lines with soft return. [HLN] sits on first baseline flush right.

- **LH2**
  - Lesson Head 2, Student Example Title: 11/13 ITC Stone Sans SemiBold, c/lc, align flush left x 41p text column, ragged right. Baseline sits 7p2 from top trim after shift of -10 pts to avoid head rule.

- **LH4**
  - Lesson Head 4, Lesson Title: 12/12 Helvetica Neue 87 Heavy Condensed, c/lc, align flush left x 41p text column, ragged right. First baseline sits 4p4 from top trim. [HLN] sits on first baseline flush right.

- **LH5**
  - Lesson Head 5, Continued: 9/12 Helvetica Neue 47 Light Condensed, c/lc, align flush left x 41p text column, ragged right. First baseline sits 5p3 from top trim. Rule is offset below x p5, spans 41p; set as 3 pt "Japanese Dots" at 25% black.

**Section Opener, Heads, Teacher Pages**
SO
Section Opener: 36/20 pt ITC Stone Sans Bold c/lc, flush left align x 41p type page, ragged right. Apply optical kern, tracking -6 and set black at 25% tint. First baseline 13p below x 38p4. Allow 3p2 b/b below.

SN# (c)
Section Number: 70/20 ITC Stone Sans Bold, inline with [SO] base. Apply optical kern, tracking -75 with [SN(c)] and space to [SO], set black at 25% tint.

ST
Section Title: 20/26 pt ITC Stone Sans Semibold c/lc, flush left align x 41p type page, ragged right. Allow 3p below.

T1
Head Level 1: 16/18 pt ITC Stone Sans Medium c/lc, flush left align x 41p type page, ragged right. Allow 2p10 b/b above and 2p3 b/b below. [T1] to table or art allow 1p4 b/t. [T1 after TAB] allows 3p4 b/b used for student tables to the head and 2p6 b/b used for teacher tables to the head.

T2
Head Level 2: 13/16 pt ITC Stone Sans Italic c/lc, flush left align at 5p6 x 41p type page, ragged right. Allow 2p3 b/b above to [T1], 2p10 b/b above to general text and 1p9 b/b below.

SX
Section Opener Text: 12/16 pt Minion Regular c/lc, flush left align on 10p7 indent x 41p text column, ragged right. Allow 1p9 b/b above and 1p10 b/b below.

SX1
Section Opener Text, First paragraph used after [T1, T2 and ST] for 2p3 b/b spacing; use only once per [SX] group. Otherwise, same specs as [SX].

GX
General Text: 12/16 pt Minion Regular c/lc, flush left align 10p7 x 41p, ragged right. Allow 2p b/b between paragraphs.

CX1
General Text, First paragraph after [T1, T2 and ST]; for 2p3 b/b spacing: use only once per [GX]. Otherwise, same specs as [GX].

SWX
Student Work Text: 13/16 pt Jotting Regular, c/lc left align, ragged right. Left-align indent on 12p4 and turns hang in 41p text column; left-align tab set on 13p10. Allow 2p b/b above and below, no extra space between lines. [SWX] to allow 2p6 b/b extra leading, contingent on text above such as Heads.

SWXN
Student Work Text Name: 13/16 pt Jotting Regular, c/lc left align, ragged right. Left-align indent on 12p4 and turns hang left-align on 13p6 in 41p text column. Colon after name has an en-space before main text. . Allow 2p1 b/b between paragraphs, 1p10 above and 2p below.

MN
Margin Note: 10/16 ITC Stone Sans Medium, c/lc left-align, ragged right x 9p1 margin column. Rule set above offset x 1p; set 100% black, dotted; spans width of margin. First line to base-align with corresponding text.

Teacher Tables

T
Teacher Table: Teacher Tables are set using the InDesign Table feature. All rules are 1/2 pt black. Offset spacing within a table cell is 4 pts on all sides. Cell height for 1-line Header and 1-line row is 1p6 minimum. Cell width of each row, 6p minimum for 2-3 column table; exceptions are for tables with 4 or more columns, spans need to be similar for [TB, TBB, TBC, TBS and TBSC] cells. Teach Tables widths spans starting indent left at 10p7, flush right. Table width should be 30p5, if content calls for the need of more space, hand spec column flush right. Allow 1p b/t above and 1p10 b/b below.

When column entries are numeric, center on column width or align on decimal, with centered column head. The same applies for single word/letter entries and short phrases. For column entries that are running text or numbered lists, text sets flush left, with flush left column head.

TCH1
Table Column Head, 1st-Level Head: 12/14 pt Helvetica Neue 75 Bold left align, ragged right. Cell height set "at least" 1p6 if one line, larger for two line ; width span 6p minimum.

TCH1-C
Table Column Head Centered, 1st-Level Head: 12/14 pt Helvetica Neue 75 Bold centered align. Cell height set "at least" 1p6 if one line, larger for two line ; width span 6p minimum.

TCH2
Table Column Sub Head, 11/14 pt Helvetica Neue 65 Medium, ragged right. Cell height set "at least" 1p6 if one line, larger for two line to fit content.

TCH3
Same as [TCH2] with addition of cell color 12% black.

TRH1
Table Row Head, 1st-Level Head: 12/14 pt Helvetica Neue 75 Bold left align, ragged right. Cell height set "at least" 1p6 if one line, larger for two line to fit content.

TRH2
Table Row Sub Head, 2nd-Level Head: 11/14 pt Helvetica Neue 65 Medium left align, ragged right. Cell height set "at least" 1p6 if one line, larger for two line to fit content.

TRH3
Same as [TRH2] with addition of cell color 12% black.

TB
Table Body: 11/14 pt Minion Regular c/lc left align, ragged right. Numbered lists hang
flush left, text indents at 1p2, tab set to same. Non-numbered text flush left or [TB FL]. Cell height space at least 1p8 for content or blank cell.

**TB FL**
Table Body Flush Left: 11/14 pt Minion Regular c/lc left align, ragged right. Used when content has no numeration or alpha sequence.

**TBB**
Table Body Bullet: 11/14 pt Minion Regular c/lc left align, ragged right. Bullet hang flush left at p6; text indents at 1p2, tab set to same. Non-numbered text flush left at 1p2. Cell height space at least 1p6 for content or blank cell.

**TBC**
Table Body Centered: 11/14 pt Minion Regular c/lc, centered. Cell height space at least 1p6 for content or blank cell.

**TBS**
Table Body Student: 11/14 pt Jotting Regular c/lc left align, ragged right. Numeration hangs flush left text indents at 1p2, tab set to same. Cell height space at least 1p6 for content or blank cell.

**TBS FL**
Table Body Student Flush Left: 11/14 pt Jotting Regular c/lc left align, ragged right. Used when content has no numeration or alpha sequence.

**TBSC**
Table Body Student Centered: 11/14 pt Jotting Regular c/lc centered. Cell height space at least 1p6 for content or blank cell.

**Lists (Teacher and Section Opener)**

**LB**
List Bulleted: 12/16 Minion Regular, c/lc left align on 11p6 x 41p text column, text turns indent also on 11p6, ragged right. Bullet hangs indent on 10p10. Allow 1p8 b/b between list items and 1p8 b/b below. [LB Last] to allow 2p1 b/b extra leading, contingent on text following.

**LB2**
List Bulleted, Sub-list (Materials): 12/16 Minion Regular, c/lc left align on 12p6 x 41p text column, text turns indent also on 12p6, ragged right. Bullet hangs indent on 11p10. Allow 1p8 b/b between list items and 1p8 b/b below. [LB2 Last] to allow 2p1 b/b extra leading, contingent on text following.

**LU**
List Unnumbered: 12/16 pt Minion Regular, c/lc left align, ragged right. Flush left-align text on 12p4, and turns hang in 41p text column. Allow 1p10 b/b above and below, no extra space between lines. [LU Last] to allow 2p1 b/b extra leading, contingent on text following.

**LN**
List Numbered: 12/16 pt Minion Regular, c/lc left align, ragged right. Right-align hanging indent on 11p8 tab for numeration; text indents on 12p4, and turns hang in 41p text column. Allow 1p10 b/b above and below. [LN Last] to allow 2p1 b/b extra leading, contingent on text following.

**LSN**
List Sub-items: 11/14 Minion Regular, c/lc left align, ragged right. Right-align hanging indent on 12p10 decimal tab for numeration; text indents on 13p6, and turns hang in 41p text column. Allow 1p6 b/b above and below. [LSN Last] to allow 2p1 b/b extra leading, contingent on text following.

**LNLS**
List Numbered, List Sub-item: 11/14 Minion Regular, c/lc left align, ragged right. Numerical is left align hanging indent on 11p8, Letter is left align on 12p10 with text indent on 13p6, and turns hang. Allow 1p10 b/b above and below.

**LSNB**
List Bullet Sub-items: 12/16 pt Minion Regular, c/lc left align, ragged right. Left-align hanging indent on 12p6 for bullet; text indents on 13p2, and turns hang in 41p text column. Allow 1p8 b/b above and below. [LSNB Last] to allow 2p1 b/b extra leading, contingent on text following.

**LM**
List Multi-Column (3): 12/16 pt Minion Regular, c/lc left align, ragged right. First column left-align indent on 12p4; second column left-align indent on 21p10; third column left-align indent on 31p2. Allow 1p8 b/b above and below. [LM Last] to allow 2p1 b/b extra leading.

**Student Pages**

**SH1**
Student Head, 1st Level: 18/19 Helvetica Neue 87 Heavy Condensed, c/lc, align flush left x 41p text column, ragged right. Worksheet Title baseline sits 3p9 from top trim and (c) Name sits on 5p4. Rule is offset below (c) Name line x 1p, spans 41p with 7p right indent; set as 3 pt “Japanese Dots” at 25% black. Molf Box top sinks from top trim x 2p5; opening of box dots is centered to last dot of rule by p6.

**SGX**
Student General Text: 11/16 pt ITC Stone Sans Medium, c/lc, align left indent 6p6 x 41p text column, ragged right with 4p right indent; a tab exists on 8p6. Allow 2p b/b above and below.

**SGX # above**
Same as [SGX], but exists to allow 2p2 b/b above to [T1]; this extra leading contingent on element or text above if not [T1].

**SLN**
Student List Numbered: 11/16 pt. ITC Stone Sans Medium c/lc, align flush left-indent at 8p x 41p text column; ragged right-indent in by 4p. Hang set on numeration tab-
align decimal at 7p9. Allow 2p2 b/b between paragraphs, 2p b/b above and 2p3 b/b below [SLSN]; 1p4 b/b below [STAB]; [SLN Last] to allow 2p2 b/b extra leading, contingent on text following.

SLSN
Student List Sub-items: 11/16 pt ITC Stone Sans Medium c/lc, align flush left-indent at 10p x 41p text column; ragged right-indent in by 4p. Hang set on lettering flush left-align 8p6. Allow 2p b/b between paragraphs, 2p3 b/b above. [SLSN Last] to allow 2p2 b/b extra leading, contingent on text following.

SBL
Student Bullet List: 11/16 pt ITC Stone Sans Medium c/lc, align flush left-indent at 9p3 x 41p text column; ragged right-indent in by 4p. Bullet hang flush left-align 8p6. Allow 1p8 b/b between paragraphs, 2p2 b/b above [SSWX/SSWXN]; 2p above for other other text.

SBL-B#
Student Bullet Space: 11/16 pt ITC Stone Sans Medium. (c)Bullet flush left-align 8p6 x 41p text column. Allow 4p b/b below and 2p2 b/b above; 2p9 in between.

SLM
Student List Multi-Column(3): 12/16 pt ITC Stone Sans Medium, c/lc left align, ragged right. First column left-align indent on 8p6; second column left-align indent on 19p; third column left-align indent on 29p6. Allow 1p8 b/b above and below, no extra space between lines. [SLM Last] to allow 2p1 b/b extra leading.

SSWX
Student Work Text: 13/16 pt Jotting Regular, c/lc left align, ragged right. Left-align indent on 8p6 and turns hang in 41p text column with right-indent 4p. Allow 2p2 b/b above and below, no extra space between lines. [SSWX #] to allow 2p6 b/b extra leading, contingent on text above such as Heads.

SSWXN
Student Work Text Name: 13/16 pt Jotting Regular, c/lc left align, ragged right. Left-align indent on 8p6 and turns hang left-align on 10p in 41p text column with 4p right indent; Colon after name has an en-space before main text. Allow 2p1 b/b between paragraphs, 1p10 above and 2p below.

SCC

SABB
Student Open Box: table cell measures 13p x 34p6. Line weight, 1 point black. Flush right x 41p text column. Allow 1p2 b/b above and 1p10 b/b below.

SABXC
Student Text Box: table cell has p8 minimum offset all sides, no more distance than what's needed around text. Line weight, 1 point black. Centered, left indent x 6p6 and right x 4p in 41p text column. Box to encompass SLBX text. Allow 1p2 b/b above and 2p2 b/b below.

SLBX
Student Answer Text: 11/14 pt Helvetica Neue 65 Medium, c/lc, centered. 1p10 in-between paragraphs. Text resides in a [SABXC] paragraph Table box.

SAB1
Student Answer Box, 1: 7p6 minimum of white space.

SAB2
Student Answer Box, 2: 16p minimum of white space.

Student Tables
STAB
Student Table: Student Tables are set using the InDesign Table feature. All rules are .5 pt black. Offset spacing within a table cell is 6 pts on all sides. Cell height for 1-line Header and 1-line row is 2p minimum. Cell width of 2-3-column table set at 6 pica minimum; exceptions are for tables with 4 or more columns, spans need to be similar for [STB, STBL] cells. For student answer spaces that are blank cells, height of cell should be 5 pica; if there is manuscript (asking a question) in cell set visual white space of 3 pica b/b from last line to rule. Student Tables width spans starting indent left at 13p, flush right. Table width should span 34p6, if content calls for the need of more space, hand spec table flush right. Allow 1p2 b/b above and 1p10 b/b below. [STAB] to [T1] allow 3p4 b/b.

When column entries are numeric, center on column width or align on decimal, with centered column head. The same applies for single word/letter entries and short phrases. For column entries that are running text or numbered lists, text sets flush left, with flush left column head.

STC1
Student Table Column; 1st-Level Head: 13/16 pt Helvetica Neue 75 Bold left align, ragged right. Cell height at least 2p.

STC1 cntrd
Student Table Column Centered, 1st-Level Head: 13/16 pt Helvetica Neue 75 Bold centered align. Cell height at least 2p.

STC2
Student Column; 2nd-Level Head: 12/16 pt Helvetica Neue 65 Medium, ragged right. Cell height at least 2p.

STC3
Same as [STC2] with addition of cell color 12% black.

STR1
Student Table Row Head: 1st-Level Head: 13/16 pt Helvetica Neue 75 Bold left align,
ragged right. Cell height at least 2p.

STR2  Student Table Row Head, 2nd-Level: 12/16 pt Helvetica Neue 65 Medium, ragged right. Cell height at least 2p.

STR3  Same as [STR2] with addition of cell color 12% black.

STB  Student Table Body: 11/14 pt ITC Stone Sans Medium c/lc left align, ragged right. Numbered lists hang flush left, text indents at 1p2, tab set to same. Non-numbered text flush left or [STB FL]. Cell height space at least 2p for content or blank cell for student’s answers.

STB FL  Student Table Body, Flush Left, no numeration: 11/14 pt ITC Stone Sans Medium c/lc left align, ragged right. Used when there is no hanging indent because of lack of numeration.

SSTB  Student Script Table Body: 13/16 pt Jotting Regular, c/lc left align, ragged right. Numbered lists hang flush left, text indents at 1p2, tab set to same. Non-numbered text flush left or [SSTB FL]. Cell height space at least 2p for content.

SSTB FL  Student Script Table Body Flush Left: 13/16 pt Jotting Regular, c/lc left align, ragged right. Used when content has no numeration or alpha sequence.

STTC  Student Script Table Body Centered: 13/16 pt Jotting Regular, c/lc, Centered. Cell height space at least 2p for content.

STBB  Student Table Body: 11/14 pt ITC Stone Sans Medium c/lc left align, ragged right. Bullet hangs flush left p4, text indents at 1p2, text turns on the same. Tab set 1p2 in. Cell height space at least 2p for content or blank cell for student’s answers.

STBL  Student Table Bullet List: 11/14 pt ITC Stone Sans Medium c/lc left align, ragged right. Bullet hangs flush left p4, text indents at 1p, text turns on the same. Tab set 1p in. Cell height space at least 2p for content or blank cell for student’s answers. Standalone Bullet has a return set for extra height.

**Backline Masters (Transparency; BLM2-Non-Lesson)**

MT1  BLM Head, 1st Level: 20/22 ITC Stone Sans Medium c/lc left align x 41p text column, ragged right. First baseline sits on 7p1. Allow 1p8 b/t to table, art and cap-height of text.

MGX  BLM Student General Text: 11/16 pt ITC Stone Sans Medium, c/lc, align left indent 6p6 x 41p text column, ragged right. Allow 2p4 b/b between paragraphs and 1p8 below to table. [MGX#] use to add space when following tables.

(Table set in BLM2)

MTAB  BLM Table: Tables are set using the InDesign Table feature. All rules are .5 pt black. Offset spacing within a table cell is 8 pts on all sides. Cell height for 1-line Header and 1-line row is 2p minimum. BLM Tables width spans starting indent left at 2p6, flush right. Table width should be 38p6, if content calls for the need of more space, hand spec column flush right. Allow 1p8 b/t above and 2p8 b/b below.

When column entries are numeric, center on column width or align on decimal, with centered column head. The same applies for single word/letter entries and short phrases. For column entries that are running text or numbered lists, text sets flush left, with flush left column head.

MTC1  BLM Table Column Head: 18/20 Helvetica Neue 75 Bold, c/lc, flush left, ragged right. Cell height space at least 2p.

MTR1  BLM Table Row Head: 18/20 Helvetica Neue 75 Bold, c/lc, flush left, ragged right. Cell height space at least 2p.

MTB  BLM Table Body: 18/20 ITC Stone Sans Medium, c/lc, left align, ragged right. Cell height space at least 2p.

MTBC  BLM Table Body Centered: 18/20 ITC Stone Sans Medium c/lc, centered. Cell height space at least 2p.

**Character Styles (c)**

Bullet  Bullet: 9/16 pt ITC Stone Sans Regular. Used for all bullets within text.

EQ text  Equation Text: 11/16 pt ITC Stone Sans Regular. Typeface style for math display in line or display.

EQ sign  Equation Sign: 11/16 pt Mathematical Pi 1. Typeface style for math display most symbols.
FM-#  Frontmatter Page Number: 11/13 pt Minion Regular.


FM-italic  Frontmatter text italic: 11/13 pt Minion Italic.


Generic Copyright  KCP Copyright: 7/9 pt Helvetica Neue 47 Light Condensed.

HLN  Lesson Notes: 12 pt Helvetica Neue 57 Condensed.


Name  Head Student Name: 14/19 pt Helvetica Neue 67 Medium Condensed.

S Bold  Student semibold: 11/16 pt ITC Stone Sans SemiBold (ms. will have bold, but in pages this will be semibold).

S Italic  Student italic: 11/16 pt ITC Stone Sans SemiItalic.

SN#  Section Opener Number: 70 pt ITC Stone Sans Bold. Black at 25% tint.

T Bold  Teacher bold: 12/16 pt Minion Bold.

T Italic  Teacher italic: 12/16 pt Minion Italic.

TB Bold  Table Bold: 11/16 pt Helvetica Neue 75 Bold.

TB Italic  Table Italic: 11/16 pt Helvetica Neue 56 Italic.

TB Head Italic  Table Head Italic: 12/16 pt Helvetica Neue 76 Bold Italic.

TypeF  Typewriter Font: 11/16 Letter Gothic Medium.

Math Composition (inline text or display):

Math  The math composition will be done with SIA2 InMath math guide

SEQ  Equation Display: 11/16 ITC Stone Sans Medium, center with 6p6 left-indent x 41p text column, 4p right-indent. Allow 1 pica of white space above and below as a display. (1p from descender above to equation, 1p from descender to cap-height with line below)