**Lesson 4: Procedural writing**

**Problem statement:**

How do designers share their design ideas through technical drawings and writing?

**Learning objectives:**

I can write directions on how to create a package, by using my team’s technical drawing to create a manual for future use by other engineers and designers.

**Lesson standards:**

[CCSS.ELA-LITERACY.W.5.2](http://www.corestandards.org/ELA-Literacy/W/5/2/) Write informative/explanatory texts

[CCSS.ELA-LITERACY.W.5.2.A](http://www.corestandards.org/ELA-Literacy/W/5/2/a/): Introduce a topic clearly, provide a general observation and focus, and group related information logically; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension.

[CCSS.ELA-LITERACY.W.5.2.B](http://www.corestandards.org/ELA-Literacy/W/5/2/b/): Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.

[CCSS.ELA-LITERACY.W.5.2.C](http://www.corestandards.org/ELA-Literacy/W/5/2/c/): Link ideas within and across categories of information using words, phrases, and clauses (e.g., in contrast, especially).

[CCSS.ELA-LITERACY.W.5.2.D](http://www.corestandards.org/ELA-Literacy/W/5/2/d/): Use precise language and domain-specific vocabulary to inform about or explain the topic.

CTE: 4. Communicate clearly, effectively and with reason.

**Soft skills:**

Students will need to communicate their ideas and use technical writing.

**Locally and/or personally relevant for students:**

Students will be asked to think of times they’ve used written or visual directions? They can be prompted toward thinking of times they played a new game, put together toys or furniture with a family member.

**Connections to career and educational pathways:**

Designers work to brainstorm ideas and come up with possible designs and solutions to problems, they share these designs with engineers and prototype designers who then work to create their ideas and decide if their ideas are feasible .

**Materials:**

-Technical Drawing from lesson 2

-Prototype created from lesson 3

-Writing Requirements (Appendix B)

-Writing Rubric (Appendix B)

-Paper or computers for groups to use in the writing process

-Examples of technical drawings (example links below)

* + <https://www.google.com/search?rlz=1C1GCEA_enUS825US834&tbm=isch&q=step+by+step+to+make+a&chips=q:step+by+step+to+make+a,online_chips:box&usg=AI4_-kTI0ABxPtvNFY2Sm-61FSEaIivpHQ&sa=X&ved=0ahUKEwjCsbPDgeXjAhXeIDQIHczmBv0Q4lYINSgJ&biw=1500&bih=890&dpr=2#imgrc=m4_pK04ykYusHM>:
  + <https://handmade-haven.com/blogs/woodworking/farmhouse-x-office-desk>

-Copy of LEGO image (Appendix A)

**Lesson preparation:**

Have copies of writing rubric for each group/ ready to project on screen

**Time required:**

Two 45-minute lessons

**Grouping of students for instruction:**

Students meet in design teams to continue their work.

**What is the instruction?:**

Students are exploring the problem by sharing information and a possible solution.

* Students will meet in design teams with technical drawings, prototype and optional notes.
* Teacher will model how to use a technical drawing (Lego visual directions below) to add procedural writing to better explain the process of their invention.
* Students will then work to make a step by step drawing and step-by-step writing that aids in the building of their package.
* Use the expectation rubric to guide students to desired outcomes.

**Understanding the Problem**

|  |  |
| --- | --- |
| **Teacher** | **Student** |
| **Introduction:** 2 minutes  Introduce the problem by sharing different examples of step-by-step directions. (examples linked in materials) Giving background to the problem.  **Ask students:**  When have you had to use directions to build or create anything?  Have you ever watched or helped your parents use directions? | Students will give examples of directions they’ve seen or used. |
| **Ask students:** 3 minutes  What worked well in the directions you were given?  What made it difficult?  What part of the example directions is easy to read?  Which directions are easy to follow from these examples?  What is difficult? | Students can share out their thinking, hopefully creating a list of things that are helpful and they thought were user friendly. |
| Teacher will display the image of the lego directions.  **Ask the students:** 3 minutes  What makes an example like this easy to use?  Would/could anyone have a problem accessing directions in this format?  What could we do to improve these directions? | Students may notice that it’s colorful, the image is large enough to see.  Maybe someone who was sight impared, someone who was colorblind, speaks another language, etc…  We could make them auditory, or put specific details in writing. |
| **Teacher explains today’s goal:** 2 minutes  “Those are great ideas, today you are going to write directions on how to create a package, by using your team’s technical drawing. You will be in a sense, creating a manual for future use by other engineers and designers to help them create your design.” | Students listen or read the target aloud with teacher |
| **Teacher models procedural writing:** 10 minutes  Teacher models with students how to use the visual of the lego example to write their own procedural writing.  “Let’s begin by looking at step one, watch me as I think aloud what I’ll be writing.”  “I notice that the bottom piece is a 2x8 flat blue piece and there is an oddly shaped red piece stacked on top at one end. Now I don’t know the technical name for this piece so I had to look it up, and found out that they are called ‘slope bricks.’ Since this is technical writing it was important for me to know the actual term used.”  Teacher could write:  Place a flat 2x8 blue lego on the table, select a 2 x 4 slope brick and place it at the far right end of the 2x8, only connecting it to the last row of knobs.” | Students watch |
| **Students practice:** 5-10 minutes  Teacher asks student groups to now practice step 2 orally within their design team. Teams can choose to write their ideas down if that helps them remember or think.  Elicit seval groups answers and record them.  With students mark any points of confusion, and add details to help clarify. | Students work with teams to write aloud.  Possible student examples:  “Step 2, collect three 2x2 red bricks and place them next to the slop bring. Next get one more slope brick and add it to the end.”  “Place a second 2x4 slope brick on the other end of your 2x8, allowing room for 3 2x2 red bricks to be set in the middle.” |
| Teacher can choose to have students independently write step 3 for the directions or practice again as a class | Students write step 3 |
| **Students work:** Remaining minutes  Teacher gives directions:  “Now it’s your turn to write a step-by-step set of directions to recreate your package. Remember these directions are for someone else to use, without your help.” | Students go off and create a draft of their step-by-step directions. |

**Accommodations:** This is an activity that can be done individually, in pairs or in groups. This can be done verbally, on a computer or handwritten.

**Extensions:**

\*This writing can go through the entire writing process, or edits, revisions and publications.

\*If students bring up the idea of making this accessible for a person who is visually impared. They could write this as a script, and they could record their directions.

**Assessment:**

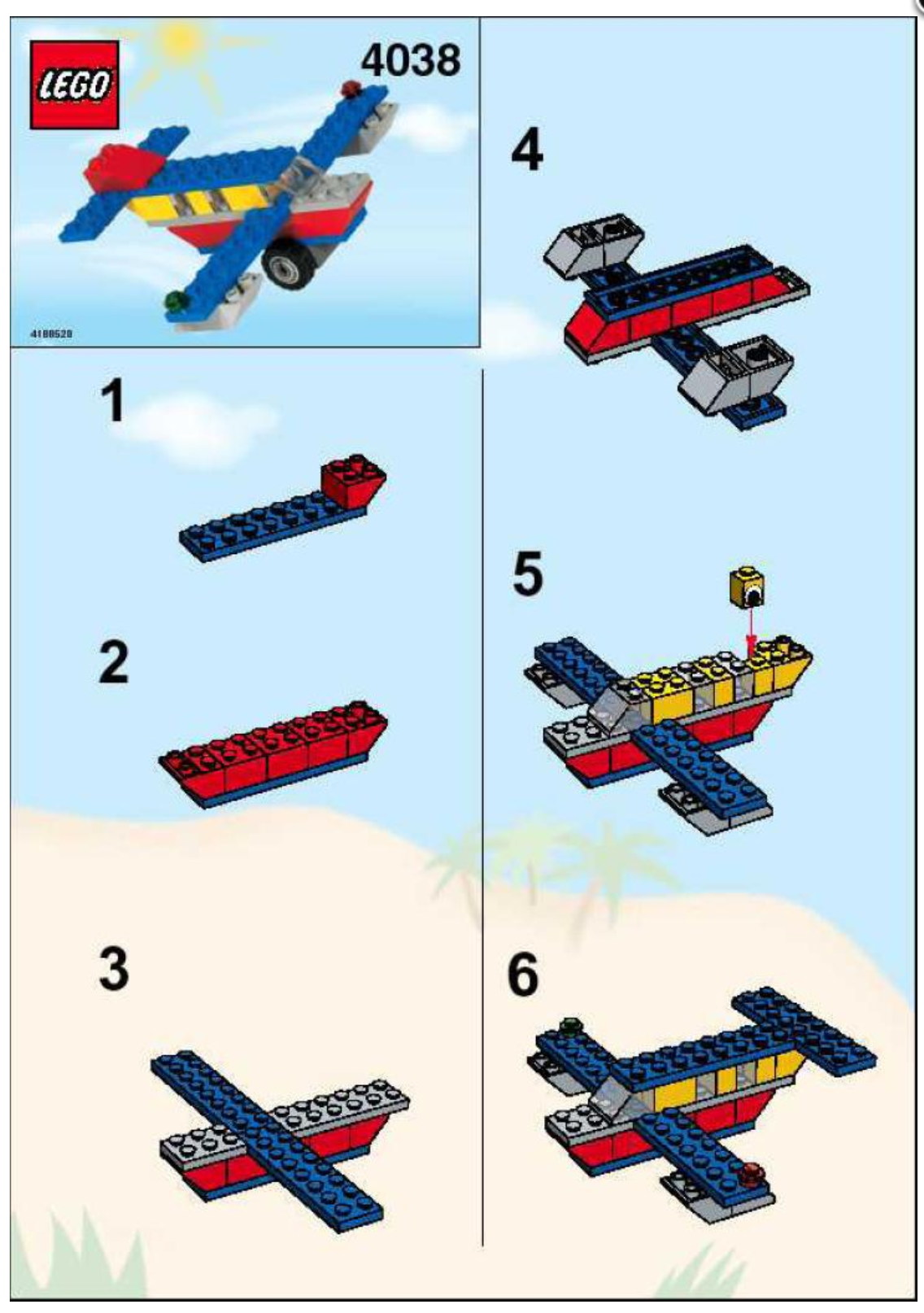
Formative Assessment in the Lessons: as students share out their write alouds, and group writings, the teacher should be taking note on what supports students need to be successful.

Summative Assessment for the Unit: Writing can be published for final project. Use rubric below

**References/Resources/Attachments/Rubrics:**

* Lego step-by-step visual instructions
* Writing Requirements
* Writing Rubric

*Appendix A*



*Appendix B*

**Writing Requirements:**

* Begin by clearly stating the final goal of the directions
* List all materials that will be needed
* Step by step directions
* Procedural writing must match your technical drawing.
* Reader must be able to follow directions independently without the help of your design team.

**Writing Rubric:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 |
| Transitions | Transitional words or phrases are missing | Attempts to use transitions | Uses transitional words and phrases within steps and between. | Uses a variety of transitional words, phrases and clauses. Transitions help clarify the relationship between and among steps. |
| Content | Focus is not maintained for audience, purpose and task | Focus is inconsistently maintained for the audience, purpose and task | Focus is maintained for the audience, purpose and task | Focus is completely maintained for the purpose, audience, and task |
| Organization | Directions are not in order | Ideas are in the correct order, but are missing steps in the directions | Organizes the directions in a logical way and includes all parts of the directions | Purposefully organizes ideas.  Organization is created with the audience in mind. |
| Conventions | Meaning Changing Errors:  -Many capitalization errors  -Many punctuation errors  -Many spelling errors  -Many Grammar errors | -Attempts to capitalize  -Attempts correct punctuation  -Attempts grade-level spelling  -Attempts grade level grammar standards | -Correct capitalization  -Correct use of punctuation  -Correct Spelling  -Correct Grammar | Enhances Meaning:  -Capitalization  -Punctuation  -Spelling  -Grammar |