Introduction
1. Title: Balance

2. Grade Level: 2nd

3. Target Group: Main stream class with integrated ELL students.

4. Source or reading material: Carolina Biological Supply, STC "Julie’s Balancing Act," Balancing and Weighing Teacher’s Guide: (Lesson 3 pgs. 3-5, Lesson 4 pg.8, Lesson 6 pg.9, Record Sheet 7-A pg. 11, Lesson 10 pg. 13. ) 2nd ed. STC Carolina Biological Supply, Carolina.


Source of Sheltered Activities: 99 Ideas and Activities for Teaching English Learners with The SIOP Model, by Mary Ellen Vogt and Janet Echevarria.

6. I want my students to know that people use balances in everyday life.

   I want my students to know how to use a fulcrum and balance.

   I want my students to know that they can apply what they learned about balancing an object to solve problems in their everyday life.
Lesson 1
### Lesson Content Objectives Lesson 1: Make It Balanced!

1. Students will be able to construct a balanced structure and keep it balanced when they add Unifix Cubes to it.
2. Students will be able to draw a diagram of their structure and label it.
3. Students will be able to describe their structures and explain how they balanced it.

### Lesson Language Objectives Lesson 1: Make It Balanced!

1a. Pairs of students will orally communicate their thoughts about how to make a balanced structure with each other, including telling their partner whether they agree or disagree.
2a. Students will write labels for their diagram using appropriate vocabulary.
3a. In whole group, students will use appropriate vocabulary to orally describe their structure and explain how they made it balance.

### Performance Indicators

<table>
<thead>
<tr>
<th>Domain and Content Topic</th>
<th>Level 5</th>
<th>Level 4</th>
<th>Level 3</th>
<th>Level 2</th>
<th>Level 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speaking; Students will talk with their partner about how to make a balanced structure.</td>
<td>Students will be able to fully discuss their ideas with a partner and give feedback using full sentences.</td>
<td>Students will be able to discuss their ideas with a partner and give feedback using full sentences from sentence starters.</td>
<td>Students will be able to discuss their ideas with a partner and give feedback using full sentences with sentence frames.</td>
<td>Students will be able to discuss their ideas with a partner and give feedback using sentence frames and a word bank with pictures.</td>
<td>Students will be able to discuss their ideas with a partner and give feedback by using gestures and picture cards.</td>
</tr>
<tr>
<td>Writing; Students will draw their structure and label it appropriately.</td>
<td>Students will independently make an accurately labeled diagram of their structure.</td>
<td>Students will make an accurately labeled diagram of their structure using a word bank.</td>
<td>Students will make an accurately labeled diagram of their structure with the teacher showing two choices to label the diagram and the student selecting one.</td>
<td>Students will make an accurate diagram of their structure. The teacher will label the diagram for the student and have them point to each label as she reads it to them.</td>
<td></td>
</tr>
<tr>
<td>Speaking; Students will report their findings to the class.</td>
<td>In whole group, students will fully describe their structure and explain how they balanced it using sentences.</td>
<td>In whole group, students will describe their structure and explain how they balanced it using sentence starters.</td>
<td>In whole group, students will describe their structure and explain how they balanced it by using sentence frames.</td>
<td>In whole group, students will describe their structure and explain how they balanced it by holding it up and pointing as their partner explains it orally.</td>
<td></td>
</tr>
<tr>
<td>Domain and Content Topic</td>
<td>Level 5</td>
<td>Level 4</td>
<td>Level 3</td>
<td>Level 2</td>
<td>Level 1</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Speaking;</td>
<td>Students will be able to fully discuss their ideas with a partner and give feedback using full sentences.</td>
<td>Students will be able to discuss their ideas with a partner and give feedback using full sentences from sentence starters.</td>
<td>Students will be able to discuss their ideas with a partner and give feedback using full sentences with sentence frames.</td>
<td>Students will be able to discuss their ideas with a partner and give feedback using sentence frames and a word bank with pictures.</td>
<td>Students will be able to discuss their ideas with a partner and give feedback by using gestures and picture cards.</td>
</tr>
<tr>
<td>Students will talk with their partner about how to make a balanced structure.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Writing;</td>
<td>Students will independently make an accurately labeled diagram of their structure.</td>
<td>Students will make an accurately labeled diagram of their structure using a word bank.</td>
<td>Students will make an accurately labeled diagram of their structure using a word bank with pictures.</td>
<td>Students will make an accurately labeled diagram of their structure with the teacher showing two choices to label the diagram and the student selecting one.</td>
<td>Students will make an accurate diagram of their structure. The teacher will label the diagram for the student and have them point to each label as she reads it to them.</td>
</tr>
<tr>
<td>Students will draw their structure and label it appropriately.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speaking;</td>
<td>In whole group, students will fully describe their structure and explain how they balanced it using sentences.</td>
<td>In whole group, students will describe their structure and explain how they balanced it using sentence starters.</td>
<td>In whole group, students will describe their structure and explain how they balanced it by using sentence frames.</td>
<td>In whole group, students will describe their structure and explain how they balanced it by showing their diagram and repeating the labels after the teacher.</td>
<td>In whole group, students will describe their structure and explain how they balanced it by holding it up and pointing as their partner explains it orally.</td>
</tr>
<tr>
<td>Students will report their findings to the class.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Lesson 1: Make it Balanced!

Materials: 20 cubes per each pair of students, 1 fulcrum, and 1 beam (Hamden Public Schools gets the materials from STC, but you could also gather these materials separately).

Procedure:

Build Background Knowledge Initiate (10min.): Ideally, students will have had a shared experience with balance, i.e. a field trip to a gymnastics center where the students practice balancing on many different structures. If this is the case start the lesson by reminding students of that experience and use how they were balanced and unbalanced as a way to introduce those words.

If a previous shared experience is not possible, open the lesson by walking on a straight line with arms out to the side and tell the students that you are balanced. Write the word “balanced,” on the board. Then walk on the line again but this time be unbalanced. Have your hands wobble and trip while walking on the line, then tell students that you are “not balanced,” and write it on the board.

Call up one student to demonstrate being “balanced” and one to demonstrate being “not balanced” have them demonstrate it for the class and then have the students assign the labels “balanced,” and “not balanced,” to them. Have each student hold up a card with the label or have them stand by the appropriate spot on the board where you wrote the labels. See pg. 8 for “Sample Word Cards” You can make your own cards or make multiple copies of “Sample Word Cards,” and use them.

Introduce key vocabulary for this lesson: Make sure that you orally model each of the sentence structures from the functional language chart for the students before they are expected to use the language. For this part of the lesson, introduce these key words: balanced, not balanced, cubes, fulcrum, and beam. This activity for introducing key vocabulary came from: 99 Ideas and Activities for Teaching English Learners with The SIOP Model, by Mary Ellen Vogt and Janet Echevarria. I used the SIOP component of building background knowledge: Realia, Photos and Illustrations (Vogt and Echevarria pg. 25). Read below for instructions on how to do the activity.

- Post the words on top of the real-life models you have in front of the room. For example, post the word “cubes” on actual cubes, the word “fulcrum” on the actual fulcrum, and the “beam” on the actual beam. Next, model how to use the word in the context of a sentence or phrase. For example, place the cubes on the beam and say “the cubes are on top of the beam,” point to each object when you say it.
- Next, have students turn to their partner and use the words that you just introduced and modeled in full sentences.
- Finally, have the students put the words into their science word dictionaries. See pg. 9, for information on “How to set up a science journal with a word dictionary.”
Everyone is on the right track.
Give the students about 5 minutes to create a structure that is balanced with only the beam and pulley. Walk around to make sure that they do not have this give them partners ahead of time and assign a work space.

Then to work. "NOTE: This will work best if students already have science partners and know the routine for finding a space to work. If they do not have this give them partners ahead of time and assign a work space.

Have one partner come up and get the materials, do not have students get the cubes yet. Have the other partner select a location for the cube. Once they have the locations, they are going to use these to make a balance.

1. Show students the cube's beam and pulley. Tell the students that today they are going to use these to make a balance.

Explore (30 min). Give students directions to try and make a structure that is balanced.

Sentences:

Illustrated sentence from the board with the word highlighted to paste in their journals. See p. 8 for word cards, and p. 12 for "Highlighted Sentences" for word cards and p. 12 for "Highlighted Sentences" for word cards.

Level 1: need to work individually with them, verbally say the key word, the students may repeat after you may just point to the word.

For word cards and p. 12 for "Highlighted Sentences" past into their journals. Provide them with one illustrated sentence from the board with the word highlighted to paste in their journals. See p. 8.

Level 2: can repeat the vocabulary words when you say them. First say the word in context as explained above, then repeat it this time stop.

Level 3: need to have sentence frames with picture and words bank with pictures (photos of the actual objects are best) posted on the board.

Students: 1.

Modifications for ELLs:
ELL's level 5: Students will be able to fully discuss their ideas with a partner and give feedback using full sentences.

Allow students at this level to get started right away. Most partners should be able to work independently from the teacher to talk with each other and come to an agreement as to whether the structure is balanced or not.

ELL's level 4: Students will be able to discuss their ideas with a partner and give feedback using full sentences from sentence starters.

Before students go to work with their partners distribute sentence starters for partners to use while creating their structure. Have students paste them in their journal. While students are working, walk around and listen to see that students are able to use the starters to express their ideas and show agreement.

See pg.8 for word cards and pg. 13 for “ELL level 4 Discussion Sentence Starters.”

ELL’s level 3: Students will be able to discuss their ideas with a partner and give feedback using full sentences with sentence frames.

Use the same process you would for Ell’s at level 4, but this time students will have the whole sentence frame, and will only need to fill in the main vocabulary word. See pg.8 for word cards and pg. 13 for “ELL level 3 Discussion Sentence Frames.”

ELL’s level 2: Students will be able to share their ideas with a partner and give feedback by being asked a yes or no question to signal agreement or disagreement and signal if the structure is balanced or not balanced.

Students at level 1 and 2 will need support from the teacher to prompt for yes or no answers. Use the Functional language chart to ask the Student “Is the structure balanced?” “Do you agree with your partner?” When you ask the question show the “Word Cards” on pg.8 and pg. 13 for “Ell level 3 Discussion Sentence Frames.” to the student so they know what you are asking.

ELL’s level 1: Students will be able to discuss their ideas with a partner and give feedback by using gestures and picture cards.

Use the same process you would for Level 2 Ell’s but allow students to respond with head nod or shake to show agreement or disagreement and allow them to point to the key word card or sentence frame.

2. Once the students have created a balanced structure without cubes, invite students to come up and get the cubes (It works best if the cubes are already grouped in sets of 20 for management purposes), tell them to see how balancing their structures will change when they add cubes.

Give them about 10 min to explore balancing their structure with cubes. Repeat the same modifications you used in step 1 for your ELL’s. See pg. 15 for “ELL level 3 Sentence frames,” for a sentence frames that include the cubes since they are now being added to their structures.
4. As students are making diagrams of their structures, take pictures of several structures that are balanced in different ways.

5. Once the students have created their diagram 0 go and label it for the student as you label the diagram put to the object and say if they point to each label as she reads it to them.

ELL's Level 1: Students will make an accurate diagram of their structure. The teacher will label the diagram for the student and have them label each label as she reads it to them.

ELL's Level 2: Students will make an accurate diagram of their structure with the teacher showing two choices to label the diagram and the student selecting the appropriate one.

Sentence Frames:

This will be useful for them when they present their findings to the class. See pg. 9 for Word cards, and pg. 12 for ELL level 3 describing.

ELL's Level 3: Students will make an accurate labeled diagram of their structure using a word bank with pictures. Use the same process before students go to work with their partners providing students with a word bank that they can use to label their diagrams. Review the word cards that you used earlier in the lesson. See pg. 9 for Word cards.

ELL's Level 4: Students will make an accurately labeled diagram of their structure using a word bank.

ELL's Level 5: Students will independently make an accurately labeled diagram of their structure. See below for ELL modifications.
1. As the class travels to each structure have the students describe their structure using their diagrams and appropriate vocabulary.

**ELL's level 5:** In whole group, students will fully describe their structure and explain how they balanced it using sentences.

*Students at this level will be able to complete the task independently.*

**ELL's level 4:** In whole group, students will describe their structure and explain how they balanced it using sentence starters.

*Before students go to share, give them description sentence starters. You or your partner can have them practice using the sentence starters based on their diagram. See pg. 18 for "Description Sentence Starters."

**ELL's level 3:** In whole group, students will describe their structure and explain how they balanced it by using sentence frames.

*Before meeting with the whole class, practice with students at this level you can do this during guided reading or while other students are working with their partners. Have them point to each label on their diagram and say it to you. Then, choose with the student one or two of the sentence frames they would like to use and practice. Let the students know that they will do what they practiced with you when it's time to share. See pgs. 19-20 for "Description Sentence Frames."

**ELL's level 2:** In whole group, students will describe their structure and explain how they balanced it by showing their diagram and repeating the labels on their diagram after the teacher.

*Before meeting with the whole class, meet with the pair of students and model chorally saying the labels on the diagram, then give students time to practice with each other. If students are not ready to share in whole group, have them repeat and chorally say the labels with just you and their partner.

**ELL's level 1:** In whole group, students will describe their structure and explain how they balanced it by holding it up and pointing as their partner explains it orally.

*When it is this student's turn, have him hold up his diagram and point to the labels. As he points to the label describe it for the class.*

2. After visiting all of the structures, bring students back to the carpet or meeting area and write down some of the ways students balanced their beams. After class print out the pictures you took of the different structures and glue/tape them to the corresponding strategy on the chart.
Fulcrum
beam
cubes
balanced/not balanced

Word Cards - balanced/not balanced/cubes/fulcrum/beam/agree/disagree/top/middle/left/right
How to set up a Science Journal with a word dictionary.

**Note:** There are many ways to set up journals and word dictionaries for your students. If your students already have one feel free to have them keep using that. You may also want to consider using your students’ regular science journals that they would normally use and set up a separate section inside the journal for a “word dictionary.” The instructions below for setting up a word dictionary are from *99 Ideas and Activities for Teaching English Learners with The SIOP Model,* by Mary Ellen Vogt and Janet Echevarria *(pgs 34-35).*

A. For the journal, give students either a standard composition notebook with a sewn binding, or a notebook with blank pages and no lines. Before, during, or after each lesson, have students write down their thoughts about what they are learning. You may want students to respond to a question or reflect on that lesson’s objectives. A successful science journal is one where students use it as a tool to help them understand content.

B. For the word dictionary, when you hand out the journal have students tape a piece of ribbon about 6in. long to the back of the notebook (the ribbon acts as a book mark). Have the students flip to the last quarter of the notebook and label it “My Word Dictionary.” This is meant to be a resource to help students learn vocabulary and spell words.

C. For 2nd graders have students write the words and draw an illustration or paste a picture next to the word on one page. Have students use the last 4 pages in the journal to keep an alphabetical word list of all the words that they have used.
1. Let's put

Have the students use the sentence starters below after you have modeled the language.

Use the key words and key phrases above as guides for what language to model in the sentence starters.

Key Phrases

- not balanced
- the fulcrum, the beam
- one cube, all the cubes, more cubes, less cubes

Key Words

- balanced
- fulcrum, beam
- cubes

ELL's Level 4 Sentence Starters
Ell’s Level 3 Sentence Frames

**Key Words**
- *cubes*
- *fulcrum* *beam*
- *balanced*

**Key Phrases**
- *one cube* *more cubes* *less cubes* *all the cubes*
- *the fulcrum* *the beam*
- *not balanced*

Use the key words and key phrases above as guides for what language to model in the sentence starters.

Have the students use the sentence starters below after you have modeled the language.

1. Let’s put________here.

2. This is__________.

3. It is__________.
5. It is not balanced.

4. It is balanced.

3. This is the beam.

2. This is the fulcrum.

1. Let's put one cube here.

Have the students use the sentence below after you have modeled the language. Use the key words and key phrases above as guides for what language to model in the sentence starters.

**Key Phrases**
- not balanced
- the fulcrum
- the beam
- one cube
- more cubes
- less cubes
- all the cubes

**Key Words**
- balanced
- fulcrum
- beam
- cubes

Ell 1's Level 2 Key Word Highlighted Sentences
ELL's Level 4 Discussion Sentence Starters

**Key Words**
- beam * fulcrum * cube
- middle * left * right * top
- *balanced
- * agree * disagree

**Key Phrases**
- one cube * all the cubes * more cubes * less cubes
- the fulcrum * the beam
- *not balanced

Use the key words and key phrases above as guides for what language to model in the sentence starters. Have the students use the sentence starters below after you have modeled the language.

1. I___.

2. Let's put____.

3. It is____.

4. IF we move____.
1. If we move the fulcrum to the beam, it will be balanced.

2. Let's put the cube here.

3. It is balanced.

4. If we move the fulcrum, it will be balanced.

Key Phrases:
- balanced
- not balanced
- beam fulcrum cube
- one cube, more cubes, less cubes, all the cubes

Insert Level 3 Discussion Sentence Frames.
Draw your balanced beam.

Beam Balance Discoveries

_________________________ Date: ____________________________

_________________________ Name: __________________________
Ell's Level 3 Discussion Sentence Frames

<table>
<thead>
<tr>
<th>Key Words</th>
<th>Key Phrases</th>
</tr>
</thead>
<tbody>
<tr>
<td>beam * fulcrum * cube</td>
<td>*one cube * more cubes * less cubes * all the cubes</td>
</tr>
<tr>
<td>middle * left * right * top</td>
<td>*the fulcrum * the beam</td>
</tr>
<tr>
<td>*balanced</td>
<td>*not balanced</td>
</tr>
</tbody>
</table>

1. I_____

2. Let's put________ here.

3. It is____________.

4. IF we move____ to the ___ then, it will be balanced.
1. The cubes are on the ______ of the ______.

2. This is where we put the ______.

3. We moved ______ to the ______ so it would be balanced.

Have the students use the sentence starters below after you have modeled the language. Use the key words and key phrases above as guides for what language to model in the sentence starters.

Key Phrases

- the fulcrum
- the beam
- one cube
- more cubes
- less cubes
- balanced
- agree
- disagree
- left
- right
- top
- beam
- fulcrum
- cube

ELL's Level 4 Description Sentence Starters
ELL's Level 3 Description Sentence Frames

Key Words
beam * fulcrum * cubes
middle * left * right * top
*balanced

Key Phrases
one cube * all the cubes * more cubes * less cubes
right side * left side * right side
the fulcrum * the beam

1. The cubes are on the _______________ of the _______________

2. This is where we put the ____. 
3. We moved the beam to the right side so it would be balanced.
Explanation of Modifications

In order for students to meet the content objectives successfully they need to be able to work and interact with other students to explore the beam balance. At the beginning of the lesson, I chose to introduce the key words through realia, and/or pictures so that students could use them as a reference during the lesson. The words introduced in this lesson will be used throughout the unit. By having students log the words along with a reference to context in their journals it gives them lots of practice and repetition with the vocabulary.

I purposely did not leave extra blanks when there were separate words. The reason for this is because I wanted the students to hear it as a unit. The focus on this lesson is mainly oral with the exception of writing labels. I wanted to give students ways to communicate their thoughts and process their observations. The differentiation between the levels for this activity does not vary that much. The main difference is that for ELL’s who are at level 4 need sentence starters to plug the key words and phrases into context. The level 3 learners need the frame along with choices to see how the words can fit into context. Level 2 and level 1 learners are not expected to produce the language but in order to understand the content they need to understand the words and linking grammar structures that are used to express ideas. I provided the sentence and highlighted the word so that they can focus on the picture and the word but also hear and are exposed to the language. Since relatively all of English is so new to these students, I chose to only give them one sentence with a word in context so that they are not overwhelmed. The main goal of the discussion modifications was to allow all students a chance to have a discussion while building their structures to help them think about the placement of the objects. Students at levels 1 and 2 do not have the proficiency to generate their own sentences so the choices provided by the teacher allow them to think about how they’re building their structure without needing to use the complex sentences. I chose three sentences that students would need to describe their structures and label the diagrams they made. The word cards and frames allow level 3-5 students to actively participate in the giving a discussion and by having the level 1 and 2 students use their diagram, they get to present to the class without having to produce the language.
Lesson 2
<table>
<thead>
<tr>
<th>Lesson Content Objectives Lesson 2</th>
<th>Lesson Language Objectives Lesson 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Students will be able to move the fulcrum to make the beam balance.</td>
<td>1a. Students will be able to read and interpret a given diagram of a beam balance.</td>
</tr>
<tr>
<td>2. Students will be able to identify and define what a fulcrum is.</td>
<td>1b. Students will be able to label where the fulcrum goes in order to make the objects balance.</td>
</tr>
<tr>
<td>2a. Students will orally explain to their partner that a fulcrum is any support on which something balances.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Domain and Content Topic</th>
<th>Level 5</th>
<th>Level 4</th>
<th>Level 3</th>
<th>Level 2</th>
<th>Level 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speaking; Students look at a diagram of a beam balance and talk with their partner to identify where the fulcrum needs to go.</td>
<td>Students will look at a diagram of a beam balance and talk with their partner to identify where the fulcrum needs to go using sentence starters.</td>
<td>Students will look at a diagram of a beam balance and talk with their partner to identify where the fulcrum needs to go using sentence frames and a word bank.</td>
<td>Students will look at a diagram of a beam balance and talk with their partner to identify where the fulcrum needs to go by orally responding “yes” or “no” to teacher questions.</td>
<td>Students will look at a diagram of a beam balance and talk with the teacher to identify where the fulcrum needs to go by responding with a nod or head shake to teacher prompts.</td>
<td></td>
</tr>
<tr>
<td>Speaking; Students will orally explain how a fulcrum functions.</td>
<td>Students will orally explain what a fulcrum does with their partner. After being prompted by teacher questions.</td>
<td>Students will orally explain what a fulcrum does with their partner, using sentence starters and a word bank.</td>
<td>Students will orally explain what a fulcrum does to the partner, by repeating key phrases.</td>
<td>Students will orally explain what a fulcrum does to their teacher, by responding with a nod or head shake to teacher prompts.</td>
<td></td>
</tr>
</tbody>
</table>
| Subject | Progressives Present | Syntax | pragmatics | Part | Principle | Explanation
|---------|----------------------|--------|------------|------|-----------|-------------
| Nouns   |               | verb  | prepositional phrase | 6. Heaviest/heaviest |  |  |
|          |              |        |             | The fulcrum needs to be under |  |  |
|          |              |        |             | The fulcrum balances the beam |  |  |
| Verbs   |                  |       |             | 5. Closer/together from |  |  |
|          |                  |       |             | 4. Most/least |  |  |
|          |                  |       |             | 3. Here/there |  |  |
|          |                  |       |             | 2. This/that |  |  |
|          |                  |       |             | 1. 0/2/3 |  |  |
| Nouns   | fulcrum/beam/cubes/cube sticks |  |  |  |  | Explanation choice
|          |                  |       |             |  |  |  |
| Structure & Discourse |         |       |             |  |  |  |
| Grammar |                   |       |             |  |  |  |
| Nouns   |               | verb  | prepositional phrase | 6. Heaviest/heaviest |  |  |
|          |              |        |             | The fulcrum needs to be under |  |  |
|          |              |        |             | The fulcrum balances the beam |  |  |
| Verbs   |                  |       |             | 5. Closer/together from |  |  |
|          |                  |       |             | 4. Most/least |  |  |
|          |                  |       |             | 3. Here/there |  |  |
|          |                  |       |             | 2. This/that |  |  |
|          |                  |       |             | 1. 0/2/3 |  |  |
| Nouns   | fulcrum/beam/cubes/cube sticks |  |  |  |  | Explanation choice
|          |                  |       |             |  |  |  |
| Structure & Discourse |         |       |             |  |  |  |
| Grammar |                   |       |             |  |  |  |
| Nouns   |               | verb  | prepositional phrase | 6. Heaviest/heaviest |  |  |
|          |              |        |             | The fulcrum needs to be under |  |  |
|          |              |        |             | The fulcrum balances the beam |  |  |
| Verbs   |                  |       |             | 5. Closer/together from |  |  |
|          |                  |       |             | 4. Most/least |  |  |
|          |                  |       |             | 3. Here/there |  |  |
|          |                  |       |             | 2. This/that |  |  |
|          |                  |       |             | 1. 0/2/3 |  |  |
| Nouns   | fulcrum/beam/cubes/cube sticks |  |  |  |  | Explanation choice
|          |                  |       |             |  |  |  |
| Structure & Discourse |         |       |             |  |  |  |
| Grammar |                   |       |             |  |  |  |
| Nouns   |               | verb  | prepositional phrase | 6. Heaviest/heaviest |  |  |
|          |              |        |             | The fulcrum needs to be under |  |  |
|          |              |        |             | The fulcrum balances the beam |  |  |
| Verbs   |                  |       |             | 5. Closer/together from |  |  |
|          |                  |       |             | 4. Most/least |  |  |
|          |                  |       |             | 3. Here/there |  |  |
|          |                  |       |             | 2. This/that |  |  |
|          |                  |       |             | 1. 0/2/3 |  |  |
| Nouns   | fulcrum/beam/cubes/cube sticks |  |  |  |  | Explanation choice
|          |                  |       |             |  |  |  |
| Structure & Discourse |         |       |             |  |  |  |
| Grammar |                   |       |             |  |  |  |
| Nouns   |               | verb  | prepositional phrase | 6. Heaviest/heaviest |  |  |
|          |              |        |             | The fulcrum needs to be under |  |  |
|          |              |        |             | The fulcrum balances the beam |  |  |
| Verbs   |                  |       |             | 5. Closer/together from |  |  |
|          |                  |       |             | 4. Most/least |  |  |
|          |                  |       |             | 3. Here/there |  |  |
|          |                  |       |             | 2. This/that |  |  |
|          |                  |       |             | 1. 0/2/3 |  |  |
| Nouns   | fulcrum/beam/cubes/cube sticks |  |  |  |  | Explanation choice
|          |                  |       |             |  |  |  |
| Structure & Discourse |         |       |             |  |  |  |
| Grammar |                   |       |             |  |  |  |
| Nouns   |               | verb  | prepositional phrase | 6. Heaviest/heaviest |  |  |
|          |              |        |             | The fulcrum needs to be under |  |  |
|          |              |        |             | The fulcrum balances the beam |  |  |
| Verbs   |                  |       |             | 5. Closer/together from |  |  |
|          |                  |       |             | 4. Most/least |  |  |
|          |                  |       |             | 3. Here/there |  |  |
|          |                  |       |             | 2. This/that |  |  |
|          |                  |       |             | 1. 0/2/3 |  |  |
| Nouns   | fulcrum/beam/cubes/cube sticks |  |  |  |  | Explanation choice
|          |                  |       |             |  |  |  |
| Structure & Discourse |         |       |             |  |  |  |
| Grammar |                   |       |             |  |  |  |
| Nouns   |               | verb  | prepositional phrase | 6. Heaviest/heaviest |  |  |
|          |              |        |             | The fulcrum needs to be under |  |  |
|          |              |        |             | The fulcrum balances the beam |  |  |
| Verbs   |                  |       |             | 5. Closer/together from |  |  |
|          |                  |       |             | 4. Most/least |  |  |
|          |                  |       |             | 3. Here/there |  |  |
|          |                  |       |             | 2. This/that |  |  |
|          |                  |       |             | 1. 0/2/3 |  |  |
| Nouns   | fulcrum/beam/cubes/cube sticks |  |  |  |  | Explanation choice
|          |                  |       |             |  |  |  |
| Structure & Discourse |         |       |             |  |  |  |
| Grammar |                   |       |             |  |  |  |
| Nouns   |               | verb  | prepositional phrase | 6. Heaviest/heaviest |  |  |
|          |              |        |             | The fulcrum needs to be under |  |  |
|          |              |        |             | The fulcrum balances the beam |  |  |
| Verbs   |                  |       |             | 5. Closer/together from |  |  |
|          |                  |       |             | 4. Most/least |  |  |
|          |                  |       |             | 3. Here/there |  |  |
|          |                  |       |             | 2. This/that |  |  |
|          |                  |       |             | 1. 0/2/3 |  |  |
| Nouns   | fulcrum/beam/cubes/cube sticks |  |  |  |  | Explanation choice
|          |                  |       |             |  |  |  |
| Structure & Discourse |         |       |             |  |  |  |
| Grammar |                   |       |             |  |  |  |
| Nouns   |               | verb  | prepositional phrase | 6. Heaviest/heaviest |  |  |
|          |              |        |             | The fulcrum needs to be under |  |  |
|          |              |        |             | The fulcrum balances the beam |  |  |
| Verbs   |                  |       |             | 5. Closer/together from |  |  |
|          |                  |       |             | 4. Most/least |  |  |
|          |                  |       |             | 3. Here/there |  |  |
|          |                  |       |             | 2. This/that |  |  |
|          |                  |       |             | 1. 0/2/3 |  |  |
| Nouns   | fulcrum/beam/cubes/cube sticks |  |  |  |  | Explanation choice
|          |                  |       |             |  |  |  |
Lesson 2: Move the fulcrum to make it balance!

Materials: one single cube, 5 cube sticks (each stick should have 5 cubes stacked together), 1 fulcrum and 1 beam per each pair of students. For each student, a vocabulary notebook (preferably students will have one from the last lesson) and Record Sheet 4-A (NSTC, Balancing and Weighing Teacher’s Guide, lesson 4.) See pg.8.

Procedure:

Build Background Knowledge (5min.): Remind students of the beams they balanced in the previous lesson by showing them the photos you took of their structures and the chart you made as a class in Lesson 1.

Introduce key vocabulary for this lesson (5-10 min): Use the Functional Language Chart provided above for specific vocabulary and sentence frames. The activity for this part of the lesson came from: 99 Ideas and Activities for Teaching English Learners with The SIOP Model, by Mary Ellen Vogt and Janet Echevarria. I used the SIOP component of building background knowledge: Realia, Photos and Illustrations (Vogt and Echevarria pg. 25). Read below for instructions.

• Post the words on top of the real-life models you have in front of the room. For example, post the word “cube sticks” on the actual cube sticks. If you have already introduced the other words in Lesson 1, you do not need to reintroduce them but you should have them up in the classroom and labeled on the objects for students to reference. Then, model how to use the word in the context of a sentence or phrase. For example, place the cube sticks on the beam and say “there are 3 cubes sticks on this side,” point to the objects and side of the beam when you say it.

• Next, have students turn to their partner and use the words that you just introduced and modeled in full sentences.

• Finally, have the students put the words into their science word dictionaries. Students should already have beam, cubes, and fulcrum in their journals. Have students go back to their journals to reference these words. For “Word Cards.” See pg.9, and if you need to directions on how to set up a journal, see pg. 10.

Modifications for ELL’s

Students at:

Level 5: can use the board and the modeled language you provided to use the words in sentences and add them to their journals. See pg. 14 for the sentence starters you might want to model.

Level 4: need to have sentence starters posted on the board or in their journal to effectively add the key word to their journal and generate sentences using it. See pg.15 for “ELL level 4 Sentence Starters” that you can use (they can be pasted into students journals, copied on to chart paper, handed out to students, or as a reference guide for you to use when modeling).

Level 3: need to have sentence frames with pictures and a word bank with pictures (photos of the actual objects are best) posted on the board or in their journal to generate sentences and add the key word to their journal. See pgs. 16-18.
to make it balanced.

Explore (30 min) Students record examples of beam balances with cubes placed in different places on the beam and determine where the fulcrum will go.

levels 2 and 3: Students are working on their own. Students are working on their own and then move to the next level. Students are working on their own.

level 3: Students are working on their own. Students are working on their own and then move to the next level.

levels 5 and 6: Students are working on their own. Students are working on their own and then move to the next level.

levels 2 and 3: Students are working on their own. Students are working on their own and then move to the next level.

students at level 4: Students are working on their own. Students are working on their own and then move to the next level.

Introduce Key Language Vocabulary for this Lesson (10-25 min)

level 1: Students are working on their own. Students are working on their own and then move to the next level.

Sentence(s) with key words from previous lesson.

level 2: Students are working on their own. Students are working on their own and then move to the next level.

Students at level 3 are working on their own. Students are working on their own and then move to the next level.

Sentence(s) with key words from previous lesson.

level 4: Students are working on their own. Students are working on their own and then move to the next level.

Sentence(s) with key words from previous lesson.

level 5: Students are working on their own. Students are working on their own and then move to the next level.

Sentence(s) with key words from previous lesson.

level 6: Students are working on their own. Students are working on their own and then move to the next level.
2. Have each Pair create the examples shown on the page using the materials you provided. Students should be able to balance the beam shown on the diagram by putting the fulcrum in the appropriate space. See below for ELL modifications.

**ELL’s level 5:** Students will look at a diagram of a beam balance and talk with their partner to identify where the fulcrum needs to go using sentence starters. *These students should be able to work independently. As they are working, walk around to make sure that they are using the sentence starters that you had them put in their word dictionaries See pg. 13 for “ELL Level 5 Sentence Starters”.*

**ELL’s level 4:** Students will look at a diagram of a beam balance and talk with their partner to identify where the fulcrum needs to go using sentence frames and a word bank. Now that you have modeled the language and have had students put the Sentence frames into their journals they should be able to use them to talk with their partner independently. Walk around as the students are exploring to make sure that they are talking with their partner and exploring how to move the fulcrum.

**ELL’s level 3:** Students will read a labeled diagram of a balanced beam without a fulcrum and interpret where the fulcrum needs to be placed by drawing and labeling it on the diagram with a word bank for support. *Hand these students a modified version of Worksheet 4-A on pg. 8. Have students use the diagram and their journals (have completed sentence frames with pictures in it) to talk with their partner about where to place the fulcrum.*

**Ell’s level 2** Students will look at a diagram of a beam balance and talk with the teacher to identify where the fulcrum needs to go by orally responding “yes” or “no” to teacher questions. Turn the sentence frames that students at levels 4 & 5 are using to talk with their partner into questions that the student can answer yes or not to. For example: “Do the cubes need to be closer to the fulcrum?” “Do the cubes need to be farther from the fulcrum?” When you ask the questions, point to the sentence frames you used. Asking the questions allows the student to respond “yes” or “no” so they get to decide where the fulcrum should be placed.

**Ell’s level 1** Students will look at a diagram of a beam balance and talk with the teacher to identify where the fulcrum needs to go by responding “yes” or “no” to teacher questions. Build each of the scenarios on the diagram with the student. Place the fulcrum directly in the middle of the beam. The beam will not be balanced. Use the word card and repeat “not balanced,” then point to the fulcrum and move the beam along the fulcrum making the cubes go closer to and farther from the fulcrum. Have the student do the same and stop when they have made the beam balanced.

3. Once the pair has figured out where the fulcrum goes, have them draw the fulcrum on the diagram and label it.

**ELL’s level 5, 4 and 3:** can do this independently but should be prompted to use their journals for spelling and as a reference.

**ELL’s level 2** *one they have balanced the beam have them point to their diagram to show where the fulcrum should go when it is balanced.* When they point to the correct spot have them draw the fulcrum in and then have them copy their word card for fulcrum next to it.

**ELL’s level 1** *one they have balanced the beam have them point to their diagram to show where the fulcrum should go when it is balanced.* When they point to the correct spot have them draw the fulcrum in. Then label the fulcrum for the student.

**Conclusion (15 min.):** Have a discussion about what a fulcrum does and how it functions.
On a chart paper record a class definition of a function as being “any support that something balances on.” Post the definition labeled work from the lesson under the definition. As the unit continues and students come across different types of functions, add them to the list under the definition.

Lesson 1: Students will orally explain what a function does to their teacher by responding with each of the four prompts in teacher prompts. As other students are discussing the function with their partners, students will work over to your All Level 2 students and use the sentence frames on pg. 8 to explain what a function does. Point to the key words and their partners. Work over to your All Level 2 students and use the sentence frames on pg. 8 to explain what a function does. Point to the key words and their partners. Work over to your All Level 2 students and use the sentence frames on pg. 8 to explain what a function does.

ELL 5 Level 2 students will orally explain what a function does to their teacher by responding with each of the four phrases. As other students are discussing the function with their partners, students will work over to your All Level 2 students and use the sentence frames on pg. 8 to explain what a function does. Point to the key words and their partners. Work over to your All Level 2 students and use the sentence frames on pg. 8 to explain what a function does.

ELL 5 Level 3 students will orally explain what a function does to their partner using sentence frames and a picture word bank. As students were working, give them the sentence frames on pg. 8 and have them use those as you model the language and ask them questions about the function. Students were working with the sentence frames on pg. 8 and have them use those as you model the language and ask them questions about the function. Working with the sentence frames on pg. 8 and have them use those as you model the language and ask them questions about the function. Working with the sentence frames on pg. 8 and have them use those as you model the language and ask them questions about the function.

ELL 5 Level 4 students will orally explain what a function does to their partner using sentence frames and a picture word bank. As students were working, give them the sentence frames on pg. 8 and have them use those as you model the language and ask them questions about the function. Working with the sentence frames on pg. 8 and have them use those as you model the language and ask them questions about the function. Working with the sentence frames on pg. 8 and have them use those as you model the language and ask them questions about the function. Working with the sentence frames on pg. 8 and have them use those as you model the language and ask them questions about the function.

ELL 5 Level 5 students will orally explain what a function does to their partner. After being prompted by teacher questions from above, as students are working, give them the sentence frames on pg. 8 and have them use those as you model the language and ask them questions about the function. After being prompted by teacher questions from above, as students are working, give them the sentence frames on pg. 8 and have them use those as you model the language and ask them questions about the function.

Language level

After students have been able to make the beam balanced by moving the fulcrum, ask them questions to help them realize the function of the fulcrum.
Where Is the Fulcrum?

Draw the fulcrum to show how the beam balanced.
Draw the fulcrum to show how the beam balanced.

Where is the fulcrum?
Word Cards — balanced/not balanced/cubes/beam/cube sticks/left/middle

- **balanced**
  - ![Balance Symbol](image)

- **not balanced**
  - ![Balance Symbol](image)

- **cubes**
  - ![Cubes Image](image)

- **beam**
  - ![Beam Image](image)

- **fulcrum**
  - ![Fulcrum Image](image)

- **cube sticks**
  - ![Cubes Sticks Image](image)

- **Part**
  - ![Part Left](image)

- **Part**
  - ![Part Right](image)
How to Use the 4-Corners Vocabulary STOP Strategy:

1. Students will have a meaningful way to keep words in their vocabulary. At the start of a new lesson, students will have a word that they will discuss in the morning. Each time they have a new word, they will underline their new word. The words will be underlined for each of the 4 corners. The first corner will have an example of the word, the second corner will show the word in a sentence, the third corner will show the word in a definition, and the fourth corner will show the word in a picture.

2. Students are able to recall vocabulary words at the end of the lesson. By using a chart that has a definition, illustration, sentence, and picture, students are able to recall vocabulary words at the end of the lesson. Students will have a word that they will discuss in the morning. Each time they have a new word, they will underline their new word. The words will be underlined for each of the 4 corners. The first corner will have an example of the word, the second corner will show the word in a sentence, the third corner will show the word in a definition, and the fourth corner will show the word in a picture.

3. The students have a meaningful way to keep words in their vocabulary. At the start of a new lesson, students will have a word that they will discuss in the morning. Each time they have a new word, they will underline their new word. The words will be underlined for each of the 4 corners. The first corner will have an example of the word, the second corner will show the word in a sentence, the third corner will show the word in a definition, and the fourth corner will show the word in a picture.

4. Students will have a meaningful way to keep words in their vocabulary. At the start of a new lesson, students will have a word that they will discuss in the morning. Each time they have a new word, they will underline their new word. The words will be underlined for each of the 4 corners. The first corner will have an example of the word, the second corner will show the word in a sentence, the third corner will show the word in a definition, and the fourth corner will show the word in a picture.

Note: These are many ways to set up journals and word dictionaries for your students. If your students already have one feel free to have them keep their vocabulary words in their dictionaries. Students can use the 4-Corners Vocabulary STOP Strategy to help them recall vocabulary words. Each time they have a new word, they will underline their new word. The words will be underlined for each of the 4 corners. The first corner will have an example of the word, the second corner will show the word in a sentence, the third corner will show the word in a definition, and the fourth corner will show the word in a picture.
Example:

**Illustration**

<table>
<thead>
<tr>
<th>Least</th>
<th>Most</th>
</tr>
</thead>
</table>

**Sentence**

Here are the most cubes.

Here are the least cubes.

**Definition**

Most: the biggest amount or greater than any other group.

Least: the smallest amount or less than any other group.

**Comparison/Relationship**

Least Less More Most
ELL's Level 5 Vocabulary Sentence Starters

Key Words
- cube *cubes *cube sticks *fulcrum *beam *balances *0 *2 *3 *part *this *that *here *there *most *least *heaviest *lightest *closer *farther

Key Phrases
- closer to *farther from

Use the key words and key phrases above as guides for what language to model in the sentence starters.

Have the students use the sentence starters below after you have modeled the language.

1. There are _____ cube sticks on the _____.

2. There is one cube on _____.

3. The fulcrum needs to be____.

4. Here are the ____ cubes.

5. They need to be ____ the fulcrum.

6. The fulcrum balances the beam.

7. The fulcrum needs to be under the ____ part of the beam.
7. The fulcrum needs to be under the ______ part of the beam.

6. The fulcrum balances the beam.

5. They need to be ______ the fulcrum.

4. Here are the ______ cubes.

3. The fulcrum needs to be ______.

2. There is one cube ______.

1. There are ______ cube sticks on ______ side.

---

*Words*

- highest/lowest
- closer to the fulcrum
- further from the fulcrum
- 0 (zero)
- 2 (two)
- 3 (three)

*Phrases*

- balances the beam
- Here/there most/least
- cube sticks on this side
- cube sticks on that side

---

Have the students use the sentence starters below after you have modeled the language. Give them the word bank below to fill in the blanks.

ELL’s Level A Sentence Starters: Use the key words and key phrases above as guides for what language to model in the sentence starters.
Ell’s Level 3 Sentence Frames

**Key Words**
- *cubes* *cube sticks* *fulcrum* *beam* *balances* *0* *2* *3* *part* *this* *that* *here* *there* *most* *least* *heaviest* *lightest* *closer* *farther*

**Key Phrases**
- *closer to* *farther from*

Use the key words and key phrases above as guides for what language to model in the sentence frames. Have the students use the sentence frames below after you have modeled the language.

1. **There are ____ cube sticks on this side.**

   ![Diagram of 0 (zero) cube sticks on a balance]
   ![Diagram of 2 (two) cube sticks on a balance]
   ![Diagram of 3 (three) cube sticks on a balance]

2. **There is one cube on ____**.

   ![Diagram of a cube on the left side marked "here"]
   ![Diagram of a cube on the right side marked "there"]
3. The fulcrum needs to be here.

4. Here are the cubes.
5. They need to be ___ the fulcrum

   closer to

   farther from

6. The fulcrum balances the beam.

   The fulcrum    balances    the beam.

   [Image of fulcrum balancing beam]

7. The fulcrum needs to be under the heaviest part of the beam.

   The fulcrum    heaviest    the beam.

   [Image of fulcrum under heaviest part of beam]
1. There are 2 cube sticks on this side.

2. Here are the most cubes.

3. They need to be closer to the fulcrum.

You have modeled the language.

Use the key words and key phrases above as guides for what language to model in the sentence frames. Have the students use the sentence frames below after first level 2 Key Word Highlighted Sentences
1. The fulcrum ____ the ____.

2. The ____ needs to be under the ____ part of the ____.

Word Bank:

<table>
<thead>
<tr>
<th>balances</th>
<th>beam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>fulcrum</td>
<td>heaviest</td>
</tr>
<tr>
<td>Part</td>
<td>Heaviest Part</td>
</tr>
<tr>
<td>------</td>
<td>--------------</td>
</tr>
<tr>
<td>Beam</td>
<td>Balances</td>
</tr>
</tbody>
</table>

3. The fulcrum -

4. The needs to be under the part of the -

Explanation Sentence Staters and Word Bank Level 3
The fulcrum balances the beam.

The fulcrum needs to be under the heaviest part of the beam.
What is happening in the sentence?

English is so new to these students. I chose to only give them one sentence with a word in context so that they are not overwhelmed.

Learning English is so new to these students. I chose to only give them one sentence with a word in context so that they are not overwhelmed.

The focus on this lesson is mainly on using a diagram and believing in the accuracy of the language. Use the word in English and they will have in their journals later on when they are ready to produce more of the language.

The focus on this lesson is mainly on using a diagram and believing in the accuracy of the language. Use the word in English and they will have in their journals later on when they are ready to produce more of the language.

Explain their own meanings and definitions of the word. I provided them in sheets for levels 1, 2, and 3 to set a graphic organizer for them to see how we explained their own meanings and definitions of the word. To set a graphic organizer for them to see how we explained their own meanings and definitions of the word.

In order to bring the focus of English up for Level 4, and 5 students, I wanted to introduce the 4-Course Vocabulary Strategy so that they could begin to understand the focus of English up for Level 4, and 5 students. I wanted to introduce the 4-Course Vocabulary Strategy so that they could begin to understand.

Explaination of Modifications
Lesson 3
<table>
<thead>
<tr>
<th>Lesson Content Objectives Lesson 3</th>
<th>Lesson Language Objectives Lesson 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Students will be able to create an equal arm balance</td>
<td>1a. Pairs of students will read and follow instructions to make an equal arm balance.</td>
</tr>
<tr>
<td>2. Students will be able to use the equal arm balance to compare the weight of 2 objects.</td>
<td>2a. Pairs of students will write and say which of two objects are heavier using binary symbols for less than &lt;, greater than &gt; and equal to =.</td>
</tr>
</tbody>
</table>

### Performance Indicators Lesson 3

<table>
<thead>
<tr>
<th>Domain and Content Topic</th>
<th>Level 5</th>
<th>Level 4</th>
<th>Level 3</th>
<th>Level 2</th>
<th>Level 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading; Students will read and follow directions to build an equal arm balance with their partner</td>
<td>Students will read and follow directions to build an equal arm balance with their partner using a graphic organizer.</td>
<td>Students will read a modified text and follow modified directions to build an equal arm balance with their partner.</td>
<td>Students will read and follow bulleted directions with pictures to build an equal arm balance with their partner after teacher modeling.</td>
<td>Students will read a labeled diagram with the teacher to build an equal arm balance with their partner.</td>
<td>Students will read a labeled diagram with the teacher to build an equal arm balance with their partner.</td>
</tr>
<tr>
<td>Speaking and Writing; Students will orally compare the weight of two objects using less than, greater than, or equal to, and will write it using the correct binary symbols.</td>
<td>Students will orally compare the weight of two objects using less than, greater than, or equal to, with sentence starters and will write it using correct binary symbols.</td>
<td>Students will orally compare the weight of two objects using less than, greater than, or equal to, with sentence frames and a word bank and will write it using the correct binary symbols.</td>
<td>Students will orally compare the weight of two objects using less than, greater than, or equal to in response to a prompt and will write the correct binary symbol in between labeled pictures.</td>
<td>Students will compare the weight of two objects by gesturing yes or no and writing the binary symbol for less than, greater than, or equal to between two pictured objects.</td>
<td>Students will compare the weight of two objects by gesturing yes or no and writing the binary symbol for less than, greater than, or equal to between two pictured objects.</td>
</tr>
<tr>
<td>Nouns &amp; Plural</td>
<td>Verbs to be</td>
<td>Pronouns</td>
<td>Modifiers</td>
<td>Sentences</td>
<td>Grammar</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------</td>
<td>----------</td>
<td>-----------</td>
<td>-----------</td>
<td>----------</td>
</tr>
<tr>
<td>Adjectives/Comparatives</td>
<td>Subject/Verb</td>
<td>He, She, It</td>
<td>Which</td>
<td>Comparative, Superlative</td>
<td>Subject, Object</td>
</tr>
<tr>
<td>Nouns/Plural</td>
<td>Pronouns</td>
<td>These, Those, These are heavier, This is heavier, Heavier.</td>
<td>Time, Place, Cause, Reason for action, Purpose, Result, Means</td>
<td>1. Put the nail on the 5. Hooks</td>
<td>Grammar</td>
</tr>
</tbody>
</table>

**Comparing the Weight of Two Objects**
Lesson 3: Let's Weigh with the Equal Arm Balance!

Materials: An assembled balance from lesson 2, an assembled equal arm balance: 2 white buckets with handles, 2 -S-hooks, a pole for a fulcrum and a base that the fulcrum twists into, a wooden arm that slides into the fulcrum to hold the buckets. Note: You will also need enough of these materials for each pair of students. You can get your own materials or you can use pre ordered equal arm balances. This lesson use the materials provided by STC Science Kit for Balancing and Weighing.

Procedure:

Build Background Knowledge (15min.):

Engage: (5 min) Remind students of the Balance structures they made in the previous lesson by showing them the chart with the definition of a fulcrum, and the photos/diagrams you posted from Lesson 1 and 2. Then tell them that today they will be making another type of balance. Bring out the equal arm balance and show it to them.

Introduce key vocabulary for this lesson (10min): Use the Functional Language Chart provided above for specific vocabulary and sentence frames. The activity for this part of the lesson came from: 99 Ideas and Activities for Teaching English Learners with The SIOP Model, by Mary Ellen Vogt and Janet Echevarria. I used the SIOP component of building background knowledge: Realia, Photos and Illustrations (Vogt and Echevarria pg. 25). Read below for instructions.

- Post the words on top of the real-life models you have in front of the room. For example, post the word “S-hook” on the actual S-hook, the word “fulcrum” on the actual fulcrum, and the “post” on the actual post. Next, model how to use the word in the context of a sentence or phrase. For example, put the S-hook in the hole of the beam and say “I put the S-hook in the hole.” The words that you introduce in the beginning help students identify the parts of the equal arm balance and will help them when they go to read the directions.

- Next, hand out the “Model of an Equal Arm Balance” on pg. 8, (if you can take a photo of the actual equal arm balance that you will be using with the students do that for an exact replica) and the “Word Cards-Language for Weighing With the Equal Arm Balance,” on pgs. 9-11. have students work individually or in pairs to paste the cards on top of the arm balance to label the parts. The cards that are not for labeling the equal arm balance should be introduced separately and used during the second half of the lesson. As you model putting the S-hook in the hole, have students watch and then paste the S-hook over the hole of the equal arm balance.

- Finally, have the students put the words for the other objects into their science word dictionaries.

Since this lesson has two parts, for now, only model the words that the students will need in order to build the balance. You will want to demonstrate the language for weighing the materials and comparing them later on in the unit.
Students will read a modified text and follow modeled directions to build an equal arm balance with their partner using a graphic organizer.

ELL 5, Level 4: Students will read a modified text and follow modeled directions to build an equal arm balance with their partner using a graphic organizer.

Students will read a modified text and follow modeled directions to build an equal arm balance with their partner using a graphic organizer.

ELL 5, Level 5: Students will read and follow directions to build an equal arm balance with their partner using a graphic organizer.

1. (Arrange) Give each pair of students direction for setting up an equal arm balance. Show them one that you have already assembled and tell them that the equal arm balance is a device for studying the forces at equal levels of English proficiency.

2. Explore (15 min) Students follow directions for setting up an equal arm balance.

Level 3: Do the same thing that you would for students at level 2, but do not require them to repeat the words in whole group. You may want to have them repeat the words in their groups. Level 2: Have them repeat the vocabulary words when you say them. Before the whole group lesson meet with them to pre-teach the words to the model.

Level 4: Have them repeat the words when you say them. Before the whole group lesson meet with them to pre-teach the words to the model. After you have modeled the language and have had the students produce it, focus on drawing a connection between the word and the model. It will help if you have your own journal to model posting the words in.

Level 5: Use the board to write the modeled language you used on the board.

Modifications for ELLs:
Hand out the “ELL Level 4 Graphic Organizer,” on pg. 21 along with the “ELL Level 4 Text for Building an Equal Arm Balance,” on pgs. 14-15. Go through the graphic organizer with the class and tell the students to fill in these steps as they read the directions. This will help students identify the actions with the words and know what the important information in the text is. Then let students get to work with their partners building the balance. Tell students to put a check after each of the directions have been completed. Most partners should be able to work independently from the teacher but check their graphic organizers before they start building to make sure they understood the text.

ELL’s level 3: Students will read and follow modified directions with simple sentences to build an equal arm balance with their partner.

Students at this level will need the text in simple sentences. Hand out “ELL Level 3 Modified directions,” (See pgs. 16-17) and then call the pairs of students up to you to read through the directions together. As you read the text with them have them model how to complete each of the steps and then send them off to build the equal arm balance with their partners.

ELL’s level 2: Students will read and follow bulleted directions with pictures to build an equal arm balance with their partner along with teacher modeling.

Give them a bulleted set of directions with labeled pictures to accompany each step. See “ELL Bulleted Directions Level 2” pg. 16. Say each step of the directions. As you say each step, point to the words and then model the step. Have the students repeat what you do with their partner to build the balance.

ELL’s level 1- Students will read a labeled diagram with the teacher to build an equal arm balance with their partner.

Call these students up to you with their partner (if you also have ELL level 2 students in your class you can call these students up together just make sure they each have the correct hand out. Model each step for building the equal arm balance as you model the step hold up the label (use “Word Cards-Weighing with an Equal Arm Balance, pg.8) say the word and point to it on their picture diagrams (ELL level 1 Labeled Diagram of an Equal Arm Balance pg. 17.)

Explore (30min.): Students use an equal arm balance to compare the weight of two objects.

(5 min.) After students have set up their equal arm balances allow them to explore putting different objects from the classroom into the buckets to see what happens. Then stop the class and get everyone’s attention.

(10min.) Once the students are together. Use Record Sheet 7-A (STC Balancing and Weighing 2nd Grade Unit Teacher’s Guide See pg. 25), to model how students can compare the weight of 2 objects. Choose two objects to model on the equal arm balance. You will want to reintroduce the vocabulary of the objects students will use. Refer back to “Introducing Key Vocabulary,” at the beginning of the lesson to see how to introduce the words and have students enter them in their journals. You will want to give students pg. 12 “Language for Comparing the Weight of Two Objects,” to put in their journals after you have modeled it. Model the language by using the sentences in the Functional Language Chart (You can also use the “ELL Level 5 Sentence
correct binary symbols. Write it down using the correct binary symbols.

ELL5, level 5: Students will orally compare the weight of two objects using less than, greater than, or equal to in full sentences with sentence frames and sentence starters to complete using their sentences starters and to write it using correct binary symbols.

ELL5, level 5: Students will orally compare the weight of two objects using less than, greater than, or equal to in full sentences with sentence frames and sentence starters to complete using their sentences starters and to write it using correct binary symbols.

ELL5, level 4: Students will orally compare the weight of two objects using less than, greater than, or equal to in full sentences with sentence frames and sentence starters to complete using their sentences starters and to write it using correct binary symbols.

ELL5, level 3: Students will orally compare the weight of two objects using less than, greater than, or equal to in full sentences with sentence frames and sentence starters to complete using their sentences starters and to write it using correct binary symbols.

ELL5, level 2: Students will orally compare the weight of two objects using less than, greater than, or equal to in full sentences with sentence frames and sentence starters to complete using their sentences starters and to write it using correct binary symbols.

ELL5, level 1: Students will orally compare the weight of two objects using less than, greater than, or equal to in full sentences with sentence frames and sentence starters to complete using their sentences starters and to write it using correct binary symbols.

ELL4, level 2: Students will orally compare the weight of two objects using less than, greater than, or equal to in full sentences with sentence frames and sentence starters to complete using their sentences starters and to write it using correct binary symbols.

ELL4, level 1: Students will orally compare the weight of two objects using less than, greater than, or equal to in full sentences with sentence frames and sentence starters to complete using their sentences starters and to write it using correct binary symbols.

ELL3, level 2: Students will orally compare the weight of two objects using less than, greater than, or equal to in full sentences with sentence frames and sentence starters to complete using their sentences starters and to write it using correct binary symbols.

ELL3, level 1: Students will orally compare the weight of two objects using less than, greater than, or equal to in full sentences with sentence frames and sentence starters to complete using their sentences starters and to write it using correct binary symbols.

ELL2, level 2: Students will orally compare the weight of two objects using less than, greater than, or equal to in full sentences with sentence frames and sentence starters to complete using their sentences starters and to write it using correct binary symbols.

ELL2, level 1: Students will orally compare the weight of two objects using less than, greater than, or equal to in full sentences with sentence frames and sentence starters to complete using their sentences starters and to write it using correct binary symbols.

ELL1, level 2: Students will orally compare the weight of two objects using less than, greater than, or equal to in full sentences with sentence frames and sentence starters to complete using their sentences starters and to write it using correct binary symbols.

ELL1, level 1: Students will orally compare the weight of two objects using less than, greater than, or equal to in full sentences with sentence frames and sentence starters to complete using their sentences starters and to write it using correct binary symbols.
Ell's level 1- Students will compare the weight of two objects by gesturing yes or no and writing the binary symbol for less than, greater than, or equal to between two pictured objects.

These students should still be working with you and their partner in small group. These students should use their “Word Cards-Weighing and Comparing Objects,” on pgs. 8-11 as you model the language and compare the objects. Give the students the hand out on pg. 26 called, “Writing Comparison Using Binary Symbols Choose the objects listed on that sheet and have the students weigh them in their equal arm balance. Then, model the language for comparing the objects and write the objects and write it in the slot for students to see. Have the students copy what you modeled. Then for the other 3 objects, have the students weigh their objects and then give them a choice and have them say or hold up the “I agree or I disagree” card. For example say “The paper clips are greater than the crayons.” Have the students say “I agree,” or “I disagree.” If the students are still pre-production, have them respond by signaling with a thumbs up for agree and a thumbs down for I disagree. Then repeat the process but switch the option, say “the paper clips are less than the crayons.” As you ask use their sentence frames and place the vocabulary word in the correct spot on their sentence frame. Then, have students respond with the correct choice.

Conclusion: This lesson does not have students come to a conclusion about their findings. Once all students have had a chance to compare the weight of 2 objects, write their findings, and share it with their partner, post their findings on a piece of chart paper and have students keep their work in their journal. The students will use this information to sequence objects by weight as they continue to explore balancing and weighing.
Word Cards - Weighing With the Equal Arm Balance

- cubes
- beam balance
- fulcrum
- not balanced
- twist
- agree
- disagree
- balanced
- Equal Arm Balance
hole

this paper clip

these paper clips

Markers

crayons

paper clips

pencils
8 cubes are greater than one cube.

One cube is less than 8 cubes.

8 cubes are equal to 8 cubes.
Student Instructions for Assembling the Equal-Arm Balance

1. Slide one S-hook into the hole at each end of the beam.

2. Twist the post into the round base.

3. Place the cross beam in the slot at the top of the post. Make sure the S-hooks are hanging down.

4. Have your partner slide the pin into the hole at the top of the post. Make sure the pin also goes through the hole in the cross beam.

5. Hang the pails on the S-hooks. There is a hole in the handle of each pail. Slide the S-hook into this hole.
1. Slide one S-hook into the hole at each end of the beam.

2. Twist the post into the round base.

3. Place the crossbeam in the slot at the top of the post.

Make sure the S-hooks are hanging down.
4. Have your partner slide the pin into the hole at the top of the post. Make sure the pin also goes through the hole in the crossbeam.

5. Hang the pails on the S-hooks.

6. There is a hole in the handle of each pail. Slide the S-hook into this hole.
1. Put one S-hook into the hole on each side.

2. Twist the post side into the round base.

3. Put the cross beam in the slot at the top of the post.
4. Put the pin in the hole.
The hole is on top of the post.

5. The pail has a hole on top.
Put the S-hooks in the holes.
- Put the post in the base.
- Put the cross beam in the slot.
- Put the pin in the hole.
- Put the pin on the S-hook.
Word Bank
S-hook * base * post * cross beam * pin
hole * slot

Put the ____ in the ____.

Put the ____ into the ____.

Put the _______ in the ____ on the post.

Put the ____ in the hole.

Put the ____ in the ____ of the pail.
Put the S-hook in the hole of the pail.

Put the pin in the hole.

Put the cross beam in the slot on the post.

Put the post into the base.

Put the S-hook in the hole.
ELL’s Level 5 Vocabulary Sentence Starters

Key Phrases
*greater than *less than *equal to

Use the key words and key phrases above as guides for what language to model in the sentence starters.

Have the students use the sentence starters below after you have modeled the language.

1. The weight of the______________ is ________ ______ the _____.

ELL’s Level 4 Sentence Starters: Use the key words and key phrases above as guides for what language to model in the sentence starters.

Have the students use the sentence starters below after you have modeled the language. Give them the word bank below to fill in the blanks.

*Words*

*  greater  *  less  *  equal  *

1. The weight of the______________ is ________ than the ______.

2. The weight of the______________ is ________ to the ________.
<table>
<thead>
<tr>
<th>Equal to 8</th>
<th>Less than 8</th>
<th>Greater than 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 cubes are equal to 8</td>
<td>One cube is less than 8</td>
<td>8 cubes are greater than one cube</td>
</tr>
</tbody>
</table>

**Words:**
- Equal
- Less
- Greater
Comparing Objects

> Heavier than
< Lighter than
= Equal to

On each line, write the names of the objects you compared. Write one symbol that shows the comparison.

1. ___________________________  (> , < , =) ___________________________

2. ___________________________  (> , < , =) ___________________________

3. ___________________________  (> , < , =) ___________________________

4. ___________________________  (> , < , =) ___________________________
Crayons
Markers
Crayons
Rulers
Cubes
Pencils
Paper Clips
Erasers

> Equal to
> Less than
> Greater than

Date:
Name:

ELL 2-Writing Comparison Using Binary Symbols
Explanation of Modifications

In order for students to meet the content objectives successfully they need to be able to follow directions and compare the objects using the equal arm balance. At the beginning of the lesson, I chose to introduce the key words through realia, and/or pictures so that students could use them as a reference during the lesson. I chose to have a graphic organizer along with the text for ELL's level 5 and 4 because I think they need to see how directions are set up and that they go in a sequence. For level 3 I still wanted to expose them to the original text format but I chose to make it on 2 pages and simplify the sentences so that they would get the meaning.

For comparing the objects, I wanted students at each level to be able to think and engage when comparing the weight of two objects. For the level 5-3 students it was important for them to see the structure of sentences that we use when we compare objects. Level 4 and Level 5 students needed small modifications with sentence starters and frames with a word bank but could then carry out the task independently. Level 2 needed the help of pictures from the word cards to label but could repeat what a teacher has modeled to experience the language. The Level 1 students are still at a pre-production stage so in order for them to take part in the content and choose/see which objects are heavier, I modified it so that they would not have to orally produce any language and could gesture to agree which object was heavier.
Checklists
Appendix A

Unit: Balancing and Weighing

Grammar and Functions Checklist

<table>
<thead>
<tr>
<th>Grammar</th>
<th>Lesson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nouns-plural</td>
<td>1, 2, 3</td>
</tr>
<tr>
<td>Nouns-singular</td>
<td>1, 2, 3</td>
</tr>
<tr>
<td>Pronouns-singular</td>
<td>1, 2, 3</td>
</tr>
<tr>
<td>Pronouns-plural</td>
<td>1, 2, 3</td>
</tr>
<tr>
<td>Verbs-present</td>
<td>1, 2, 3</td>
</tr>
<tr>
<td>Verbs-present progressive</td>
<td>1, 2</td>
</tr>
<tr>
<td>Verbs-past</td>
<td>1</td>
</tr>
<tr>
<td>Opposites</td>
<td>1</td>
</tr>
<tr>
<td>Modifiers</td>
<td>1, 2, 3</td>
</tr>
<tr>
<td>Quantifiers</td>
<td>1, 2</td>
</tr>
<tr>
<td>Prepositions</td>
<td>1, 2</td>
</tr>
<tr>
<td>Coordinating conjunctions</td>
<td>1</td>
</tr>
<tr>
<td>Articles</td>
<td>1, 2, 3</td>
</tr>
<tr>
<td>Comparatives</td>
<td>2, 3</td>
</tr>
<tr>
<td>Superlatives</td>
<td>2</td>
</tr>
<tr>
<td>Numerals</td>
<td>2</td>
</tr>
<tr>
<td>Verb to be/is vs. are</td>
<td>3</td>
</tr>
<tr>
<td>Compound sentences</td>
<td>3</td>
</tr>
<tr>
<td>Adjectives</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Functions</th>
<th>Lesson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordinating conjunctions</td>
<td>1</td>
</tr>
<tr>
<td>Report</td>
<td>1</td>
</tr>
<tr>
<td>Explain</td>
<td>1, 2</td>
</tr>
<tr>
<td>Evaluate</td>
<td>1, 3</td>
</tr>
<tr>
<td>Make Decisions</td>
<td>1</td>
</tr>
<tr>
<td>Hypothesize</td>
<td>1</td>
</tr>
<tr>
<td>Cause/Effect</td>
<td>1</td>
</tr>
<tr>
<td>Describe</td>
<td>1</td>
</tr>
<tr>
<td>Identify</td>
<td>1, 2, 3</td>
</tr>
<tr>
<td>Problem Solve</td>
<td>2</td>
</tr>
<tr>
<td>Sequence</td>
<td>3</td>
</tr>
<tr>
<td>Follow directions</td>
<td>3</td>
</tr>
<tr>
<td>Compare/Contrast</td>
<td>3</td>
</tr>
</tbody>
</table>
TSL 518: Sheltered ELL Strategies Checklist

Write the page numbers and any other identifying features to identify those parts of your lessons that employ the following strategies.

<table>
<thead>
<tr>
<th>SHELTERED STRATEGIES</th>
<th>Lesson 1</th>
<th>Lesson 2</th>
<th>Lesson 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Contextualize Lesson</td>
<td>P. 3</td>
<td>S. Key  V. P. 3</td>
<td>Intro</td>
</tr>
<tr>
<td>1.A. Build and Activate Background Knowledge</td>
<td>P. 3</td>
<td>U. 4-6</td>
<td>Key VAC P. 3</td>
</tr>
<tr>
<td>1.B. Develop Vocabulary</td>
<td>P. 3</td>
<td>U. Exp.</td>
<td>P. 3</td>
</tr>
<tr>
<td>1.C. Use extensive Visuals, Realia, Manipulatives, &amp; Gestures</td>
<td>P. 9-12</td>
<td>S. Exp.</td>
<td>P. 8-10</td>
</tr>
<tr>
<td>1.D. Model (Instructions, Processes)</td>
<td>P. 3-6</td>
<td>S. Exp.</td>
<td>P. 3-6</td>
</tr>
<tr>
<td>1.E. Create Opportunities To Negotiate Meaning</td>
<td>P. 3-4</td>
<td>U. Exp.</td>
<td>P. 3-7</td>
</tr>
</tbody>
</table>

II. Make Text Comprehensible

II.A. Intentional Use of Graphic Organizers

II.B. Modify Written Text

II.C. Amplify Number of Activities per Text

III. Make Talk Comprehensible

III.A. Pace Teacher's Speech

III.B. Use of Listening Guides

III.C. Use of Word Walls

III.D. Frame Main Ideas

III.E. Check for Understanding

IV. Change Traditional Classroom Talk

IV.A. Use Teacher Question and Response Strategies

IV.B. Practice Instructional Conversations

V. Engage at Appropriate Language Proficiency Levels

V.A. Vary Question Techniques based on Student's Language Proficiency level-- in conversations, activities, and assessments

VI. Give Students Voice

VI.A. Challenge students to produce extended academic talk

VI.B. Model Language for Oral and Written Production

VI.C. Use Group/Pr. Work to Elicit Student Talk; Students as Researchers

VI.D. Respond to Student's Voice – Writing and Error Correction
Original Lessons
1. Title: Balance

2. Grade Level: 2nd

3. Target Group: Main stream class with integrated ELL students.

4. Source or reading material: Carolina Biological Supply, STC “Julie’s Balancing Act,” Balancing and Weighing Teacher’s Guide: (Lesson 3 pgs. 3-5, Lesson 4 pg.8, Lesson 6 pg.9, Record Sheet 7-A pg. 11, Lesson 10 pg. 13. ) 2nd ed. STC Carolina Biological Supply, Carolina.


Source of Sheltered Activities: 99 Ideas and Activities for Teaching English Learners with The SIOP Model, by Mary Ellen Vogt and Janet Echevarria.

6. I want my students to know that people use balances in everyday life.

I want my students to know how to use a fulcrum and balance.

I want my students to know that they can apply what they learned about balancing an object to solve problems in their everyday life.
Lesson 1.

2. FQ: How would life be different if we couldn't balance?

Lesson Two: Building Structures that Balance (TG 9-12)

Procedure:
- Divide students into pairs and give each group a fulcrum, beam, and 20 unifix cubes. Ask students to build a structure.
- Ask: What could you remove from your structure and still have it balance?
- Why would your structure fall over if I removed this piece?
- Where could you add unifix cubes to your structure without making it become unbalanced?
- If you wanted to make it fall over, where would you add unifix cubes?
- Invite students to describe their structures. Discuss what they discovered while building them.
- Brainstorm other ways to balance and weigh. Record on a chart.
- Read and discuss Bigu, Rhodon & Beau (pgs 53-58 in the Read-Aloud Anthology: Vocab. Lesson 9).
- Complete FOSS Home/School Connection 1.

Lesson 2.

3. FQ: What can you change in order to balance objects?

Lesson Three: Exploring the Beam Balance (TG 15-25)

Procedure:
- Review how students created a balanced structure. Then display an assembled beam balance with the fulcrum under the center of the beam. Let students know this structure is called a beam balance and they will be building them today.
- Discuss what might happen when unifix cubes are added to the beam balance.
- Once the balances are assembled, have students explore what happens when they place the unifix cubes on the beam. Encourage them to place the cubes in various positions on each side of the beam.
- Complete record sheet 3-A.
- Ask: How did you make the beam balance?
- When would the beam not balance?
- What did you discover when you put the cubes in different places on the beam?
- To help students recognize that a fulcrum is any support on which an object balances, discuss the similarities between the material they used in this lesson and those in lesson 1. Is the fulcrum more like the pencil or butterfly? How? Describe similarities and differences. Read and discuss Julie's Balancing Act.
- Suggestion: Consult with the PE teacher about a balancing and weighing connection.

Lesson Four: Moving the Fulcrum (TG 27-30)

Procedure:
- Refer students to record sheet 4-A. Working in pairs they will place the cubes on the beam in the way shown on the record sheet.
- They will slide the beam across the fulcrum to find the spot where the beam becomes level and record this position on the sheet.

Lesson 3.

Lesson Six: Exploring the Equal-Arm Balance (TG 45-53)

Procedure:
- Display a beam balance. Ask students to discuss with their partners what they know about the beam balance.
- Distribute one Post-It note to every two students and have them write one thing they know about the beam balance on it. Then ask them to stick the post it to a large Venn diagram in the circle labeled "Beam Balance".
- Introduce the equal arm balance by displaying an assembled one.
- Have students look at the instructions to assemble their equal arm balances.
- Have students use materials from their desks to explore what happens when they place objects in the pails.
- Encourage them to place various combinations of objects in the pails.
- Ask: What can you do to make one pail move down? Up?
- What can you do to make the two pails level?
- Ask students to discuss with their partners what they have observed about the equal-arm balance. Distribute another Post-It note and have them record one observation about the equal arm balance on it. Then stick the note in the circle on the Venn diagram labeled "Equal Arm Balance".
- Initiate a class discussion to help students compare their observations about the beam balance and the equal arm.

Balancing and Weighing - Grade 2
Approved by Board of Education June 6, 2012
Record Sheet 4-A

Name: ____________________________

Date: ____________________________

Where Is the Fulcrum?

Draw the fulcrum to show how the beam balanced.
Student Instructions for Assembling the Equal-Arm Balance

1. Slide one S-hook into the hole at each end of the beam.

2. Twist the post into the round base.

3. Place the cross beam in the slot at the top of the post. Make sure the S-hooks are hanging down.

4. Have your partner slide the pin into the hole at the top of the post. Make sure the pin also goes through the hole in the cross beam.

5. Hang the pails on the S-hooks. There is a hole in the handle of each pail. Slide the S-hook into this hole.
Record Sheet 7-A

Name: ____________________________

Date: ___________________________

Comparing Objects

> Heavier than
< Lighter than
= Equal to

On each line, write the names of the objects you compared.
Write one symbol that shows the comparison.

1. ________________________________  ________________________________  (> or <, =)

2. ________________________________  ________________________________  (> or <, =)

3. ________________________________  ________________________________  (> or <, =)

4. ________________________________  ________________________________  (> or <, =)
Beam Balance Discoveries

Draw two ways you balanced the beam.
2. FQ: How would life be different if we couldn't balance?

Lesson Two: Building Structures That Balance  (TG 9-12)

Procedure:
- Divide students into pairs and give each group a fulcrum, beam and 20 unifix cubes. Ask students to build a structure.
- Ask: What could you remove from your structure and still have it balance? Why would your structure fall over if I removed this piece? Where could you add unifix cubes to your structure without making it become unbalanced?
- If you wanted to make it fall over, where would you add unifix cubes?
- Invite students to describe their structures. Discuss what they discovered while building them.
- Brainstorm other ways to balance and weigh. Record on a chart.
- Read and discuss Biju, Bonbon & Beau (pgs 53-56 in the Read-Aloud Anthology- Vocab, Lesson 9).
- Complete FOSS Home/School Connection 1.

3. FQ: What can you change in order to balance objects?

Lesson Three: Exploring the Beam Balance  (TG 15-25)

Procedure:
- Review how students created a balanced structure. Then display an assembled beam balance with the fulcrum under the center of the beam. Let students know this structure is called a beam balance and they will be building them today.
- Discuss what might happen when unifix cubes are added to the beam balance.
- Once the balances are assembled, have students explore what happens when they place the unifix cubes on the beam. Encourage them to place the cubes in various positions on each side of the beam.
- Complete record sheet 3-A.
- Ask: How did you make the beam balance? When would the beam not balance? What did you discover when you put the cubes in different places on the beam?
- To help students recognize that a fulcrum is any support on which an object balances, discuss the similarities between the material they used in this lesson and those in lesson 1. Is the fulcrum more like the pencil or butterfly? How? Describe similarities and differences. Read and discuss Julie's Balancing Act.
- Suggestion: Consult with the PE teacher about a balancing and weighing connection.

Lesson Four: Moving the Fulcrum  (TG 27-30)

Procedure:
- Refer students to record sheet 4-A. Working in pairs they will place the cubes on the beam in the way shown on the record sheet.
- They will slide the beam across the fulcrum to find the spot where the beam becomes level and record this position on the sheet.
- Ask: Why is the fulcrum in this spot? Why does the beam balance when the fulcrum is here? Why do you think the beam can balance with an uneven number of cubes on the ends?

4. FQ: How do we compare objects?

Lesson Six: Exploring the Equal-Arm Balance  (TG 45-53)

Procedure:
- Display a beam balance. Ask students to discuss with their partners what they know about the beam balance.
- Distribute one Post-It note to every two students and have them write one thing they know about the beam balance on it. Then ask them to stick the post it to a large Venn diagram in the circle labeled "Beam Balance".
- Introduce the equal arm balance by displaying an assembled one.
- Have students look at the instructions to assemble their equal arm balances.
- Have students use materials from their desks to explore what happens when they place objects in the pans.
- Encourage them to place various combinations of objects in the pans.
- Ask: What can you do to make one pan move down? Up? What can you do to make the two pans level?
- Ask students to discuss with their partners what they have observed about the equal-arm balance. Distribute another post it note and have them record one observation about the equal arm balance on it. Then stick the note in the circle on the Venn diagram labeled "Equal-Arm Balance".
- Initiate a class discussion to help students compare their observations about the beam balance and the equal arm balance.

Balancing and Weighing - Grade 2
Approved by Board of Education June 6, 2012
Lesson Seven: Using the Equal-Arm Balance to Compare Objects (TG 55 – 59)

Procedure:
- Use record sheet 7-A to make comparisons. Review directions on the sheet pointing out the box that highlights the binary symbols. Let students know they will use these symbols to record their observations.
- Have students select six objects from their desks that they would like to compare. Remind them to compare only two objects at a time and record their comparisons on the record sheet.
- Ask each student to select one comparison from their record sheet to share with the class. Use binary symbols to record these comparisons on a chart entitled "Comparing Objects".

Lesson Eight and Nine: Developing Strategies for Placing Objects in Serial Order and Placing Six Objects in Serial Order (TG 61-76)

Procedure:
- Have students collect the 6 objects (ball, spoon, cup, metal cube, wood block, cylinder) and predict the serial order from lightest to heaviest.
- Have students tell if the equal arm balance to compare the 6 objects and arrange them in serial order. Ask students "What do you use about the object if the pan moves down?"" How can you use what you observe about the two pans to decide which object is heavier?"
- Place their objects on their desks from left to right beginning with the lightest object.
- Have students cut out the pictures of the objects and glue them to a strip of paper in a way that shows the serial order of the 6 objects.
- Discuss how their predictions about the serial order compared with the results. Make a chart on the board showing the binary symbols between the objects to show their relationships.
- Have students discuss the strategies they used to compare the 6 objects.

Lesson Ten and Eleven: Balancing with Unifix Cubes and Graphing the Weights of Objects (TG 79-96)

Procedure:
- Have students look at Record sheet 10-A. Ask students to write the names of the 6 objects in the left column from lightest (top) to heaviest (bottom).
- Place an object in on each pan and ask students how they could use unifix cubes to balance the cross beam.
- Record results on the record sheet.
- Show students a half sheet of newsprint. Let them know they will turn it so the longer side is vertical to make a bar graph to show the information that appears on the record sheet.
- Have students cut out as many cubes as they need and glue the appropriate number of cubes above each object to show its weight.
- Ask several students to describe their graphs. Encourage other students to ask questions during these presentations.
- Read Weighing Animals at the Zoo. Ask: How might a zookeeper weigh other animals? How much do you think a hippo weighs? How could you find out?

Lesson Twelve and Lesson Thirteen: Describing the Four Foods and Comparing Cupfuls of Foods (TG 101-112)

Procedure:
- Hold up the 6 objects the students worked with earlier in the unit and ask them to discuss why the objects weigh different amounts. Let students know that they will compare and weigh foods.
- Distribute a cup containing one piece of each of the four foods and a copy of record sheet 12-A. Review the properties, (color, shape, size and texture).
- Observe the foods and record the descriptions together.
- When the chart is complete ask: Which food is biggest? Smallest? Alike? Different? Heaviest? Lightest?
- Fill cups exactly the same level with the four foods.
- Ask students to predict a serial order for the foods, from lightest to heaviest.
- Record their predictions on record sheet 13-A.
- Place the cups in the pans and weigh them against each other to find the serial order. Record results.

Lesson Fourteen: Weighing Cupfuls of Food (TG 115 – 120)

Balancing and Weighing - Grade 2
Approved by Board of Education June 6, 2012