Measurable Attributes (Heavy/Light)

Grade and Content Area	Kindergarten Mathematics
Title	Measurable Attributes (Heavy/light)
GLEs/GSEs	M(G&M)–K–7 **Demonstrates conceptual understanding of measurable attributes** using comparative language to describe and compare attributes of objects (length [longer, shorter], height [taller, shorter], weight [heavier, lighter], temperature [warmer, cooler], and capacity [more, less]); and compares objects visually and with direct comparison.
Context of the Lesson	After completing several lessons on linear measurement using non standard and standard types of measurement tools with emphasis on comparative language (longer, shorter and taller, shorter), students will begin to explore relative mass. Students will be guided through this investigation in three ways: comparing two objects based on visual inspection, holding the objects, and finally using a balance.
Opportunities to Learn	**Materials** • Objects varying in the weight (Suggestion: Each pair of objects should be of similar shape and different color.) • Simple balance scales • Checklists • Recording Sheets (Suggestion for alternate recording sheets: provide each child with one sheet showing empty balances and the other sheet with pictures corresponding to the pairs of objects. The pictures will be cut and pasted onto the balances as each weighing occurs.) • Crayons • Pencils **Classroom Environment** • Students' opportunities to participate include whole class discussions, whole class predictions, teacher modeling, and group work. • Students are prompted to use the comparative language heavier and lighter throughout their observations. • The teacher records students' performances, on a class list attached to a

Opportunities to Learn	clipboard, while circulating throughout the room. • These hands-on activities activate Kindergarteners' learning. • Clear behavioral and academic expectations should be well established. **Differentiation of Instruction** • Children will be arranged in groups of four for small group work. • Each group will be balanced with high, medium, and low performing students. **Depth of Knowledge** *Level 2* This activity requires students to demonstrate a conceptual understanding of measurable attributes while applying the ability to use learned material in new situations with minimum direction.
Objective(s)	**Students will:** 1. Understand that weight is a form of measurement; 2. Demonstrate an understanding that the weight of an object can be measured using a balance; and 3. Demonstrate an understanding of relative weight using the comparative language of heavier and lighter.

Instructional Procedures Continued	**Opening (approximately 15 minutes)** 1. The teacher gathers all the children to a common area after arranging them into groups of four. The lesson begins with a brief inquiry to activate students' prior knowledge about weight asking such questions as: Which do you think is heavier a tennis ball or an orange? How do you know? (no objects are shown at this point). 2. The teacher then states the objectives of the lesson: We are going to compare two objects using three different methods: seeing, touching and using a balance. 3. The teacher holds up two objects - a tennis ball and an orange. Students are asked to record their prediction on their individual checklists (see attached checklist). The teacher then proceeds to have students record their 'guesses' for the remaining 3 pairs of objects.
	Engagement (at least 20 minutes) 1. Students will be given the same four pairs of objects modeled in the Opening to hold in their hands to test their predictions. 2. The teacher will observe students' responses and comments and explain that our hands are a non-standard form of measurement. The teacher may offer the students the opportunity to change their 'guesses' on their checklists. 3. After a brief explanation about the parts to the balance, the teacher models weighing the tennis ball and orange on the balance. The teacher repeats this demonstration using other objects to model how to use the scale reserving the original three pairs for group work. Students should be very clear about up for light objects and down for heavier objects. 4. Students are given directions on how to record their information on their individual balance sheet using the shape of the object and the color of the object from the checklist as a guide to distinguish the heavier object from the lighter object placed in the appropriate pan (down for heavier, up for lighter). 5. Each group of four students moves to their tables for an independent exploration of their balances and objects. 6. Students will complete their own balance sheet with each student taking a turn to weigh a different pair of objects.

Instructional Procedures Continued	**Closure (approximately 15 minutes)** 1. The teacher calls the groups to the common gathering area. 2. Each group is asked to report out on one experiment. The teacher uses the following common questions: Which object was heavier? Which object was lighter? Which object caused the pan to move into the 'down' position? Which object caused the pan to move in the 'up' position? 3. While students are sharing their observations and balance sheets, encourage the use of full sentences using the terms heavier and lighter in each presentation. 4. Reflect on the lesson and discuss the relationship that size has to weight. Were all the larger objects heavier than the smaller objects? Were all the smaller objects heavier than the larger objects? Were there any surprises?
Assessment	Teacher observations of students' participation during class discussion, group work, and presentations • Student work on checklists • Student work on balance sheets
Reflection	**Student Work Sample 1: Approaching Proficiency** Students who are approaching proficiency struggle with the balance. They take a significant amount of time to use the balance as a scale. Oftentimes, these students forget to record their results or don't know where to put their measurements. However, inability to finish the activity and articulate their understanding precludes a determination of proficiency.
	Student Work Sample 2: Proficient Students performing at the proficient level weigh all objects as directed, record results, make comparisons, and can articulate the comparisons using heavier and lighter.
	Student Work Sample 3: Exceeds Proficiency None available

Reflection Continued	**Lesson Implementation** I was very happy with the outcome of this lesson plan. The children were actively engaged, they responded well to the activities, and they were able to use the language of heavier and lighter as well as demonstrate an understanding of using a balance. Kindergarteners respond well to teacher modeling and to hands on activities. This lesson provided them with both these essential elements of a good lesson plan. The students enjoyed using the balances and they worked well in their small groups. The area that I found that students had difficulty was in recording their observations. Despite my efforts to model in the whole group setting, some students were recording their objects on the wrong side of the balance. It would be interesting to see if students would do a better job if the recording sheet were changed so that the balance pans were more clearly up and more clearly down. The students that had difficulty were very easily redirected and they made their corrections instantly, but about ¼ of the class had difficulty with their recordings. The balances were accurate, but the question is was their interpretation of the balances off or was the recording sheet the barrier to success? The students need additional experiences using the balances and recording their observations. Next class, we will weigh pairs of different sized objects having the same shape as we did this class. We will also weigh same sized objects having different shapes so we can further explore the question - Does size make a difference? Eventually, we will revisit this concept of weight as a form of measurement where students will have to find objects that are EQUAL in weight as opposed to objects varying in weight. These recording sheets will have scales going straight across so the recording will not be the challenge, finding objects of equal weight will be the challenge!