

Content

- Estimate time, weight, width and length and use instruments to make these measurements
- Measure width and length using steps and arm lengths

Target group

- Children ages 10 to 12
- Level: A1+ / A2

Language goals

The children will be able to

- Understand a short (technical) film
- Find precise information in a text
- Expand their passive and active vocabulary
- Understand technical terminology in context
- Understand and answer simple thematic questions
- Formulate their ideas/opinions using simple verbal tools
- Use and develop learning strategies (break a complex storyline down into individual steps, make conjectures, correctly spell words)
- Understand and follow instructions

Word bank

Breite (width) *Länge* (length), *messen* (to measure), *schätzen* (to estimate), *ungefähr* (approximately), *Fluss* (river), *Ufer* (shore), *Wie schwer?* (How heavy?), *Wie breit?* (How wide?), *Wie lang?* (How long?), *Stirn* (forehead), *arm* (arm), *den Punkt immer fest im Blick halten* (hold one's gaze on a point), *Schritte zählen* (to count steps), *es stimmt* (it's correct)

Materials

- Laptop and projector
- Audio speakers
- Blackboard and chalk/whiteboard and markers
- Stopwatch
- Scale
- Tape measure
- Students' portfolios

Materials for printing and/or copying

- *Guessing and Measuring* (Schätzen und Messen) worksheet
- *River Width* (Flussbreite messen) word bank
- My word bank sheet *River Width* (Flussbreite messen)
- *Now I know* (Ich kann schon) questionnaire

Duration

2x45 minutes

Before the lecture/film		
Step	Content	Materials
1	<p>Instructor welcomes the children and places the following measuring instruments on the table: <i>a stopwatch, a scale, a tape measure</i>. Instructor names the instruments and writes their names on the board. The children repeat the words together in order to reinforce them.</p> <p>Instructor asks: What can we measure with these instruments? Instructor writes the answers on the board: <i>Stopwatch - Measure time / Scale - Measure weight / Tape measure - measure length, measure width</i></p>	<p>Stopwatch; Scale; Tape measure; Blackboard and chalk/whiteboard and markers</p>
2	<p>Instructor says: <i>So we can use these instruments to determine precisely how long something lasts, or how heavy it is, or how long and how wide it is.</i></p> <p>Instructor writes the matching questions on the board: Stopwatch - Measure time - How long? / Scale - Measure weight - How heavy? / Tape measure - Measure length - How long? / Measure width - How wide?</p> <p>Instructor asks: <i>What if we do not have a stopwatch, a scale or a tape measure? How do we know how long something lasts? Or how heavy, how long, or how wide something is? In that case we can't measure it. We must estimate the time, the weight, the length and the width.</i></p>	
3	<p>Instructor invites students to do an experiment, saying: <i>Here's an example: We would like to have a soft-boiled egg for breakfast. A soft-boiled egg is best if it is boiled for three minutes. Because we don't have a watch we must estimate when the three minutes are over. Can we figure out when one minute is over? Let's try. Everyone please stand. When I say "start," I will start the stopwatch. Sit down when you think a minute has gone by.</i></p> <p><u>Note:</u> Instructor starts the stopwatch and makes a note of at how many seconds the first and the last child sit down. Instructor writes down these two times on the board so that the children can see how differently they perceive time. If the children enjoy this experiment, it can be repeated multiple times..</p>	<p>Stopwatch</p>
4	<p>Instructor suggests that the students select an object in the classroom and estimate its <i>weight</i>. Each child writes his or her estimate down. Then the object is placed on the scale and weighed in order to determine who made the best estimate.</p>	<p>Scale</p>
5	<p>The third experiment is about <i>length</i> and <i>width</i>. The children estimate <i>how long and how wide</i> the classroom is. Like with the weight, the children write down their estimates of the measurements. Then the students measure the room with a tape measure and they compare their estimates with the real measurement data.</p>	<p>Tape measure</p>

<p>6</p>	<p>Instructor asks: <i>We can also measure length and width in other ways. Without a tape measure. Do you have an idea of how we could do this?</i></p> <p>The children make conjectures or share their experiences. Maybe they have already seen how someone has measured length and width with finger lengths, steps or arm lengths.</p> <p>Instructor moderates the discussion and then says: <i>Before, we measured how long and how wide our classroom is using a tape measure. Now we do it using a different method. I will walk along the walls with large steps and everyone count the number of steps I take.</i></p> <p>Instructor and children write the number of steps for the length and the number of steps for the width of the classroom on the board. Then the instructor asks the children to measure how large his or her steps are using the tape measure: <i>approximately a meter.</i></p> <p>Instructor and children determine together that using this method it is also possible to measure length and width pretty precisely: <i>An adult's large step is approximately a meter.</i></p> <p>Note: At this point, the group can take a brief detour and talk about how the basic calculation of one meter per step is the basis for how the step-counter works. A normal step for an adult who is 150-170 cm (4'11" - 5'7") tall is calculated to be approximately 70 cm (2'4").</p>	<p>Tape measure; Blackboard and chalk/whiteboard and markers</p>
<p>7</p>	<p>Instructor and children carry out the same experiment, but the instructor measures the length of the classroom's wall with an extended arm. Instructor and children determine together that the length between the center of the chest and the tips of fingers of an extended arm is also approximately one meter. So this can also be used to measure length and width.</p>	<p>Tape measure; Blackboard and chalk/whiteboard and markers</p>
<p>8</p>	<p>As a point of comparison, instructor and children measure the steps and arm lengths of the individual children and write down the average on the board. This can be a basis for the children to use if they would like to measure something using this method.</p>	<p>Tape measure; Blackboard and chalk/whiteboard and markers</p>
<p>During the lecture/film</p>		
<p>Step</p>	<p>Content</p>	<p>Materials</p>
<p>9</p>	<p>Instructor says: <i>Now let's watch a film in which the width of a river is measured, just as we did, without a tape measure (Minute 1:23-2:24).</i></p>	<p>Laptop and projector; Audio speakers</p>

10	Instructor suggests that the children immediately try out what they just learned. They walk together along the hallway/the playground/the auditorium and measure their respective widths. Instructor helps them, like Christoph the field researcher. It is important the each child understands the underlying logic.	
11	<p>Afterwards, the instructor invites the children to rewatch the film, this time also with the second part, in which Christoph tests out his first measurement. (Minute 1:23-3:29).</p> <p>They then discuss as a group what Christoph did. They reinforce the fact that one can carry out measurements pretty precisely using steps and arm lengths.</p>	Laptop and projector; Audio speakers
After the lecture/film		
Step	Content	Materials
12	<p>The children divide up into "field researcher groups" and each group gets an <i>Estimating and measuring</i> (Schätzen und Messen) worksheet.</p> <p>Note: The worksheet is just an example in this case. The instructor should formulate the questions him- or herself based on how the school is set up. Possible questions include: <i>What is the distance from the door of the school to the closest bus stop? How long is the fence that surrounds the school? How wide is the playground? etc.</i></p> <p>The children can also formulate their own questions that they would like to know the answer to.</p> <p>The children fill out the worksheet in two steps: first they write down their estimates, then they get up and test out their estimates using steps or arm lengths and write down these results as well.</p> <p>After the exercise is completed, the instructor hangs up the worksheets on the wall/board and the group discusses them.</p>	<i>Estimating and measuring</i> (Schätzen und Messen) worksheet
13	<p>Instructor asks the children to return to their seats and projects the word bank <i>River Width</i> (Flussbreite messen). Each child is given the word bank sheet <i>River Width</i> (Flussbreite messen) and lists the words and expressions closely together on the dotted lines. When they are done, they take a ruler and measure how long what they have written is. They write this number into the final sentence on the worksheet: <i>In this lecture I learned ___ inches (centimeters) of words. :-)</i></p>	Word bank <i>River Width</i> (Flussbreite messen); My word bank sheet <i>River Width</i> (Flussbreite messen); Laptop and projector

14	Instructor and children end the unit with a reflection round, in which they discuss what they have learned. Each child then fills out the <i>Now I know</i> (Ich kann schon) questionnaire to find out whether they have achieved the learning objectives. Instructor also gives feedback on student performance.	<i>Now I know</i> (Ich kann schon) questionnaire
15	The children hold onto the following in their portfolios: - My word bank sheet <i>River Width</i> (Flussbreite messen) - <i>Now I know</i> (Ich kann schon) questionnaire	Portfolios

Further ideas for subject matter or CLIL teaching (mathematics, physics):

- Estimate and measure the length, width, and height of objects outside the school (in the city/in nature). The children can also learn new measurement methods, such as the Biltmore stick or triangles, to measure the height of a tree or estimate distance using one's thumb.
<https://de.scoutwiki.org/Schätzen>
<https://de.wikipedia.org/wiki/Stockpeilung>
<https://de.wikipedia.org/wiki/Daumensprung>
http://www.schule-bw.de/unterricht/faecheruebergreifende_themen/landeskunde/modelle/verbuen-de/geowissenschaften/landwirtschaft/lebensraum_wald_hochmoor_beispiel_nordschwarzwald/m5.pdf
- We used different methods to detect the various "dimensions" of the world: Organize an event at school to estimate and measure temperature, weight, quantity height, etc.

Suggestion for the children at the end of the learning scenario

At the very end, the children gather around a computer or the instructor projects a computer desktop onto a screen. They look at the home page of the German Digital Kinderuniversity together. The instructor explains to the children that they now have completed the *River Width* (Flussbreite messen) lecture in the *Nature* faculty together and draws their attention to the fact that there are many more interesting lectures in this faculty and in the *Technology* and *Humankind* faculties.

The instructor and the children click together on the At Home link and discover how the website works. As an example, the instructor logs in and goes to the lecture that they just worked through. The instructor shows the children that the lecture begins with an introduction by Professor Einstein and Ms.

Schlau and that their work is supported by Jowo and Christoph, the field researcher. Professor Einstein and Ms. Schlau also wrap up all the lectures and thereby frame the work on each theme.

The instructor explains to the children that they can re-watch the film at home and can even set the subtitles to German or English. That way, they can "catch" key words while watching and use these to collect points and solve three exercises and a bonus exercise on the film. The children can also get help from their parents or grandparents, from registering to solving the exercises. The whole family can have fun learning and everyone gradually becomes a professor at the Kinderuni.