



Learning Objects



Why Learning Objects?

The idea that levels of understanding differ from one individual to the next is not news to anyone inside or outside the field of education. Educators, especially, know that the students in their classrooms arrive with varying levels of knowledge and competence related to the skills and content they must learn. The more recent use of assessment software along with the past decade's emphasis on standardized testing have made such differences, or "gaps," even more apparent.

Regardless of this diversity in knowledge and needs, schools are expected to bring students in each grade to roughly the same level by the end of the year. Since knowledge gaps and skill deficits apply to individual students, it follows that the ideal instructional program would be individualized as well. To succeed in its mission to teach all students, a school would need to present each individual student with the instruction needed to fill in the gaps and ensure that the student is ready to learn the material required at grade level. If an individual student fails to master the new material, remediation would be required—but only for those students who need more instruction and practice with a particular objective.

One teacher with thirty or so students will find it difficult, if not impossible, to provide thirty instructional pathways, or even 5-10 such pathways, assuming students can be grouped according to knowledge or skill deficits. Technological advances over the past decade offer great promise for individualizing instruction so that an entire class of students arrives at the same or similar learning outcomes by the end of the year. However, that promise has yet to be fulfilled in most schools.

One obstacle is that the assessment technologies now widely used to measure students' readiness and mastery of target objectives (standards) provide only half a solution to the problem of individualizing instruction. Knowing what a student needs to know is quite different from providing instruction that fills that gap. Once a teacher identifies a student's individual need, he or she must provide the instruction for that particular need—whether that instruction represents remediation, on-level instruction, or advanced learning.

The use of learning objects as an approach to individualizing instruction may offer the best hope for schools that are serious about addressing the individual needs of students or groups of students with similar needs.

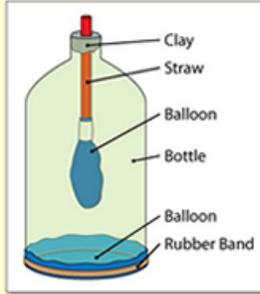


What are Learning Objects?

The concept of “learning objects” has been around for several decades now—long before the technology needed to deliver them electronically. The original definition was related to the kinds of “objects” that computer scientists used to construct software programs. Now that online learning has become more viable for both virtual and blended classrooms, formal efforts to define learning objects have resulted in a more refined understanding of the possibilities offered when technology meets instructional design. The International Association for K-12 Online Learning (iNACOL) defines a learning object as an electronic media resource (a digital file or collection of files) targeting a lesson objective, standard, or concept, in a way that can be used and reused for instructional purposes.

The iNACOL definition distinguishes a learning object from an “information object,” a simple set of related facts that might have an illustration or other material attached to it, or a “content asset” such as an image, animation, video, audio clip, or text document. The feature that separates a learning object from other types of digital objects is the learning object’s clear connection to an instructional objective. A learning object may include one type of file or many, one activity or several, but everything within the learning object is included to produce a better understanding of one or more learning objectives.

Step 3: Assemble and add the "diaphragm."

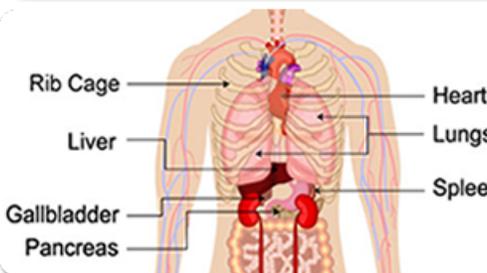


Put the "lung" and the "bronchus" into the bottle, with the top of the "bronchus" coming out through the top of the bottle (the "rib cage"). Seal around the "bronchus" with clay so that it is airtight. Cut off the stem of another balloon with the scissors, and stretch the balloon across the bottom of the "rib cage" so that it is tight. Secure this balloon with another rubber band. What does this second balloon represent? Think about the answer, and then click Show Me to see if you are correct.

[Show Me](#)

Respiratory and Immune Systems Working Together

Transcript 1:53



Rib Cage Heart
Liver Lungs
Gallbladder Spleen
Pancreas

Student Name: _____

Modeling the Human Lung

Inhalation and exhalation together make up ventilation, which is the process by which air enters the lungs from the environment.

Part One: Construct the Model!

DIRECTIONS: Use these steps to create a model of the process of ventilation.

For this model, you will need:

- A plastic 2-liter bottle
- A plastic drinking straw
- 2 large balloons
- Scissors
- Tape (electrical tape is best)
- A Rubber band
- Clay

Step 1: Prepare the "ribcage". Make sure your 2-liter bottle is clean and dry. Remove the label, and do your best to clean the bottle of any glue or adhesive. Carefully cut about 2 or 3 inches from the bottom of the plastic bottle with the scissors. The bottle will represent a ribcage, although it won't expand like yours does.

Step 2: Make a "lung". Insert a straw about halfway into one of the balloons. Use tape to securely tape the straw in the balloon so it is airtight. The balloon represents a lung, and the straw, a bronchus. Recall that in your own body the bronchi branch off from the trachea in an upside-down "Y" shape into two lungs.

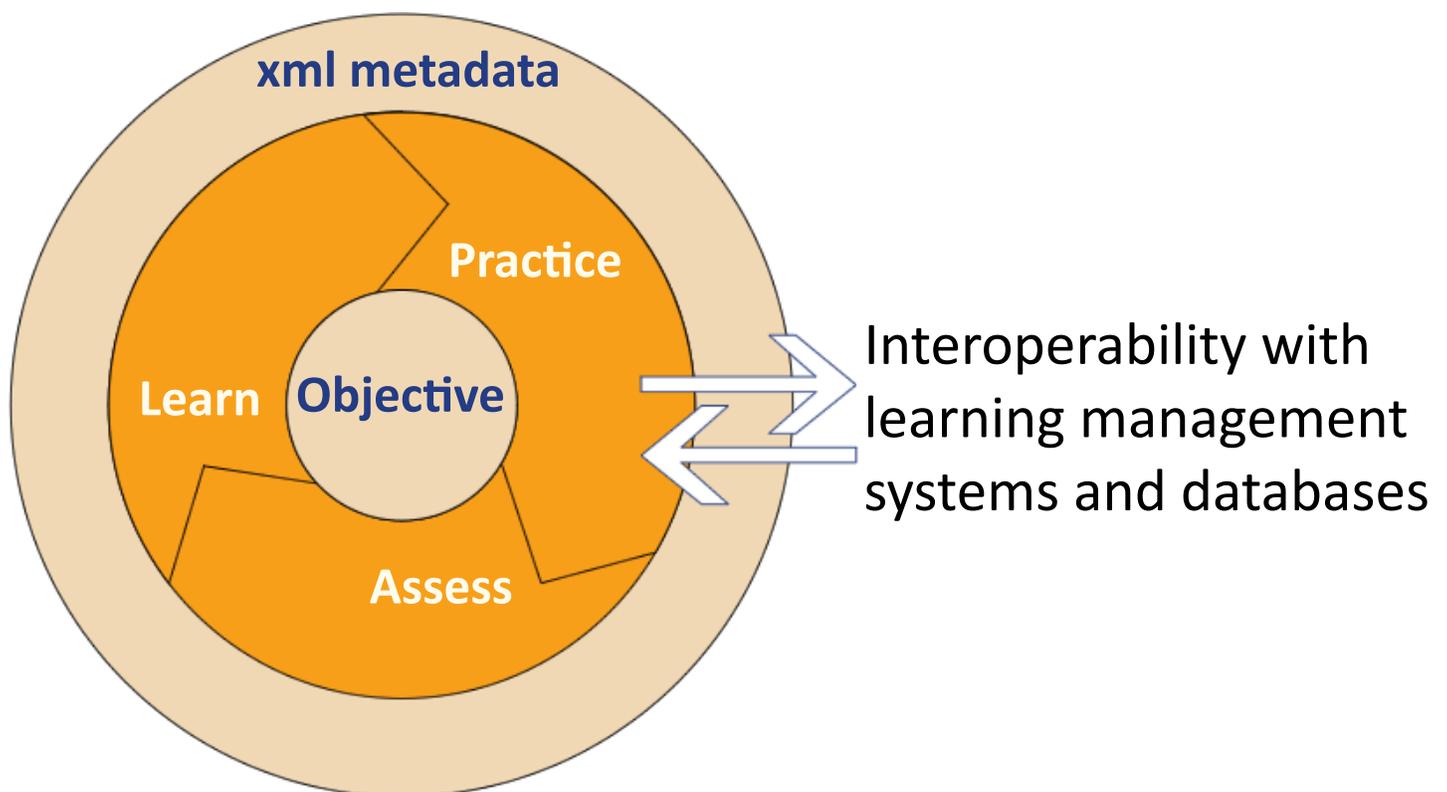
Step 3: Assemble and add the "diaphragm". Put the "lung" and "bronchus" into the bottle, with the top of the "bronchus" coming out through the top of the bottle (the "ribcage"). Seal around the "bronchus" with clay so that it is airtight. Cut the stem of another balloon off with the scissors, and stretch the balloon across the bottom of the "ribcage" so that it is tight. Secure this second balloon, which will represent the diaphragm, with a rubber band.

The best learning objects can stand alone as lessons or mini-lessons while also allowing for combination with other learning objects to provide an individualized learning “pathway” for each learner or a group of learners with similar needs. Sets of learning objects may be assembled to form lessons, larger modules or units, and entire courses.

What's Inside a Learning Object?

A complete learning object consists of information objects and content assets created to support a small set of instructional objectives (often just one objective). Generally, a learning object will start with a presentation of facts and concepts delivered as instructional text and imagery, a video or animation, or an interactive experience. Practice activities will follow this initial presentation, and assessment will form the final section of the learning object, with questions focused narrowly on the learning object's identified instructional objectives.

For learning objects to be effective as individualized instruction, each object must include metadata—indexing information that allows a search engine to identify the learning object based on keywords and other characteristics. When learning objects are stored in a repository or library, teachers and course builders can locate the instruction a student needs (using the xml metadata associated with the object) and then deliver that lesson as a link, typically within a learning management system used by the school or student.



How Are Learning Objects Used?

According to the iNACOL definition, learning objects must target specific learning objectives in a way that allows for broad utilization across multiple scenarios and situations. Most organizations that produce learning objects, including Accelerate Education, rely on digital tools and assets, and xml metadata, to produce this kind of portability. The best learning objects can be delivered to students using a wide range of digital platforms and learning management systems—rather than being tied to any one environment. For this reason, learning objects like those produced by Accelerate Education can be used effectively in both virtual and blended learning environments. In either environment, teachers or administrators can use electronic assessment tools to identify individual or group needs and then manually assign learning objects for students to access within the school’s preferred learning management system. Alternatively, a school can utilize learning objects within a fully functioning “adaptive” course that delivers learning objects dynamically, based on each student’s performance on assessments.

Both of these uses of learning objects empower educators to create differentiated instruction opportunities for individual students. The result is a far more effective and sophisticated approach to remediation, instruction, and enrichment than what is possible in a traditional classroom without access to digital learning objects. Teachers can level thier classrooms in real time using adaptive assessments, and students can learn exactly what is needed at the moment without delay, allowing any and every student to continue learning at a reasonable and productive pace. In particular, learning objects are used to address these aspects of instruction:

Prerequisite Learning – Most lessons start with the assumption that students have reached a certain level of understanding before attempting the lesson. If a “pre-test” reveals that a student lacks the prerequisite skill needed to complete a lesson, a learning object focused on each of the missing skills can help the student catch up before beginning the on-level lesson.

Remediation – If a student fails to achieve the objectives associated with a lesson, that student not only falls behind other students in the class but also may become disheartened and prone to accepting failure as an outcome. A learning object that addresses the failed lesson’s content and skills in a slightly different way, perhaps with more carefully scaffolded support, can give a student the additional instruction he or she needs to get back on track with other students in the class.

Advanced Learning - It can be difficult for any teacher to keep all students moving forward, including advanced students who may need additional instruction or activities to feel challenged by the course. An approach to curriculum planning that relies on learning objects can provide advanced instruction to students who seem better prepared, eager to move ahead, or interested in exploring course topics more deeply.

Adaptive Learning – Technological advances related to assessment have it possible to produce courses that automatically “adapt” to a student’s abilities and learning preferences, presenting instruction that targets an individual student’s needs. Well-designed learning objects are essential for creating these types of courses. Once the assessment piece of the program has identified content or learner characteristics that must be addressed by a piece of instruction, a learning object’s metadata is used to identify the lessons that are likely to work best for each student.

Teacher Time – When learning objects are used to address the individual needs of students related to skill-building, teachers may find they have much more time to work directly with their students in the classroom. Ideally, the time-consuming tasks of creating and scoring assessments, analyzing the data, and choosing resources to match individual students’ needs are accomplished by a learning management system populated with digital learning objects. As a result, teachers can focus on other essential teaching goals, such as building a community in the classroom, creating authentic opportunities for students to share their new knowledge, and facilitating the growth of critical thinking through discussion and debate.

Standards Alignment – Because they are created to address one objective or a small set of related objectives, learning objects are ideally suited to standards-based instruction. The objectives and/or standards addressed by each learning object are included as part of that object’s metadata, which makes it easy to assess a lesson’s or a course’s alignment with standards and to create reports documenting that alignment. Assessments delivered at any time during the year can identify the standards that a student has not yet mastered and deliver instruction targeted to those standards. If a district identifies gaps in standards coverage, learning objects that address the missing standards can be added to the school’s curriculum.

One-to-One Initiatives – In an effort to have all students connected to quality digital learning programs and resources, many school districts have adopted initiatives aimed at supplying every student with a computer of some type. More affordable options, such as Chromebooks, iPads and other tablets, and smartphones have increased the number of districts attempting to create a “1-to-1” ratio of student to connected device. The most useful learning objects, such as the ones produced by Accelerate Education, are compatible with the platforms that run on these smaller, lighter devices.
test.



What are Accelerate Education Learning Objects?

To address the need for learning objects that individualize instruction in the ways described in this paper, Accelerate Education created the IDEAL Learning Library for grades K-12. The IDEAL Learning Library consists of a “bank” or repository of digital learning objects, each developed to address one or more standards-based objectives. Most learning objects contain several pages of initial interactive instruction followed by guided and independent practice activities, an informal “self-check,” and then a more formal assessment.

Teachers and administrators can search the IDEAL Learning Library by standard, objective, or keyword—then simply drag and drop the appropriate learning object into the virtual syllabus of an individual student or a group of students. Accelerate Education’s learning objects are ideally suited to adaptive learning systems and models. Additional assessments related to each learning object can be added to each virtual classroom as well.

In some programs and courses, Accelerate Education provides automatic individualized remediation of prerequisite skills using its IDEAL learning objects. Remediation learning objects are embedded within an on-level or more advanced lesson to provide additional support to students whose skills are not as strong as other students in the class. For instance, a non-graded self-assessment may appear just before the lesson’s graded assessment. This self-check assesses each student’s understanding of the lesson’s objectives and, if the student performs poorly, presents an additional learning object that will help the students remediate the skills required to do well on the lesson’s graded quiz.

Learning Objects are available in the following topics:

Algebra	Earth Sciences	Operations	Scientific Inquiry
American History	Fractions & Decimals	Painting & Sculpting	Space Sciences
Ancient Civilizations	Geometry	Physical Education	Spelling
Biology	Grammar	Physical Sciences	US Government
Civics	Life Sciences	Probability	Vocabulary
Crafts	Measurement & Data	Ratios & Proportions	World History
Drawing	Number Sense	Reading	Writing



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