Illinois Alternate Assessment Science Frameworks Priorities Grade 11

In the spring of 2006, a team of Illinois educators created the new Illinois Alternate Assessment (IAA) Frameworks. The purpose of the frameworks is to prioritize the skills and knowledge from the Illinois Learning Standards for students with the most significant cognitive disabilities, in order to develop a new Illinois Alternate Assessment. The Illinois State Board of Education (ISBE) contracted Pearson Educational Measurement (PEM), and their subcontractor partners, Beck Evaluation and Testing Associates, Inc. (BETA), and the Inclusive Large Scale Standards and Assessment (ILSSA) group, to develop the new IAA in grades three through eight and 11 for Reading and Mathematics; in grades four, seven, and 11 for Science; and in grades three, five, six, eight, and 11 for Writing. BETA's responsibilities include providing event-based assessment activities linked to the IAA Frameworks, developing the assessment rubric, and incorporating principles of Universal Design for Learning. ILSSA's responsibilities include facilitating the development of the IAA Frameworks and providing state-wide staff development on how to access grade-level curriculum. Pearson Learning Group (PLG) is a division of PEM, and their responsibilities include providing a customized on-line scoring tool along with training to use this feature.

During the framework development meetings, educators were divided into development teams based on both content area and grade level focus. Addressing reading, writing, mathematics and science, each content area had one development team for grades three through five, one for grades six through eight, and one for grade 11. Each team consisted of at least one general education teacher, one special education teacher, and one content expert. The process used by the development teams to create the Illinois Alternate Assessment Frameworks is as follows:

The development teams reviewed each of the assessment objectives (statements coded with numbers such as 11.11.01) in grade 11. For each assessment objective, the teams:

- Identified the critical function, or the main idea, of the objective;
- Wrote an instructional activity that could be used to teach the skills needed to meet the assessment objective in the general education classroom;
- Wrote a modified instructional activity that could be used to teach students with the most significant cognitive disabilities the same skills; and
- Identified two to three assessment activities that could be used to assess students with the most significant cognitive disabilities on the skills described in the modified activity.

After the development teams examined the assessment objectives and wrote both instructional and assessment activities for each grade level, the teams prioritized the assessment objectives, and selected the assessment objectives which are most suitable for students with the most significant cognitive disabilities. The leadership team at ISBE reviewed these priorities for further refinement. These pilot priorities will form the basis for the new IAA performance test items. Following the completion of the spring 2007 science pilot, a review may be necessary in order to determine if the new IAA mathematics priorities are appropriate and provide a comparable assessment to the regular statewide assessment.

Using grade-level curriculum as the focus, the development teams described the instructional and assessment supports, accommodations, and assistive technology required to ensure access to quality instruction. The descriptions produced by the development teams were summarized into a set of statements designed to provide consistency across the content frameworks. These statements are as follows:

- Appropriate instruction must occur prior to the assessment activity.
- All activities must provide appropriate support, accommodations, and/or assistive technology during both the instructional activities and the assessment process. This may include the following:
    - The use of prompting strategies, ranging from minimum prompts to full physical assistance in order to create a learning continuum for correct responses.
    - The use of assistive technology, ranging from low tech to high tech.
    - The reduction of breadth, depth, and/or complexity.
- Specific instructional strategies and the instructional environment for the individual student vary and should be determined by the student's IEP team.
- During assessment activities, the students should use the mode of communication that they used to learn and practice the skills during instructional activities.

- Instruction should be presented to the student in a way that is authentic, accessible, and meaningful (e.g., tactile objects, picture symbols, or use of a text reader), to ensure the student has multiple opportunities to learn and demonstrate knowledge.
- Instruction should take place within the context of grade-level content, using age-appropriate activities and materials, regardless of the placement of the student.
- Instruction must incorporate age appropriate activities and materials which represent the same grade level content as their peers without disabilities. However, the activities and materials may be adapted to meet the individual needs of the student (e.g., reduce the language requirements or difficulty of the task) as long as the context of the materials used by same age peers remains intact.

All instructional practices should occur using available resources and materials familiar to the learners.

Communication skills are essential to the assessment of students with significant cognitive disabilities. Symbolic communication skills form the foundation for reading, mathematics, and writing. Students with significant cognitive disabilities are very diverse in their communication ability. Some students communicate symbolically, while others communicate in highly individualized ways. There are some important considerations in the development of symbolic communication skills which include the following:

- All students communicate regardless of their level of symbolic language use.
- Students with the most significant cognitive disabilities can acquire generalized use of objects (or object selection) to communicate preferences (Hetzroni, Rubin, Konkol, 2002).
- Language learners must use symbols repeatedly, interactively, and generatively during meaningful and ongoing activities in language-rich environments (Goossens, Crain, & Elder, 1992; Cafiero, 1998; Goossens, et al., 1992; Romiski & Sevcik, 1996; Miller & Eller-Miller, 2002; Mirenda, 2003).
- Competent use of language for multiple purposes, audiences, and contexts facilitate the metalinguistic skills required for reading comprehension (Rankin, Harwood, & Mirenda, 1994).

The assessment activities in this document reflect three types of students who represent the continuum of communication skills within this student population.

- The first activity is designed for students who inconsistently respond to communication and inconsistently use words, objects, or gestures to communicate expressively.
- The second activity is for learners who are beginning to use understandable communication through gestures, pictures, objects/textures, points, etc., to clearly express a variety of intentions.
- The third activity is for students who are using verbal or written words, sign language, Braille, or any language-based augmentative system to request, initiate, and respond to questions, describe things or events, and express refusal.

Throughout the frameworks document, the suggested general education instructional and modified instructional activities are written in plural form, as instruction is typically provided to a whole class. However, the instruction for these activities may be provided in the context of whole class instruction, small group instruction, or individually based on student needs. Conversely, the assessment activities are written in the singular form, as the IAA is a standard assessment measuring individual performance.

The process of reviewing the frameworks and aligning the new IAA to the Illinois Learning Standards and regular assessment is an ongoing process. The activities in this document were created by Illinois teachers and are only suggested activities that may be used to teach the assessment objectives listed. The activities, materials, and techniques listed in the frameworks are just one possible way to teach these assessment objectives and should not to be considered the state-mandated strategy for teaching any given assessment objective. Teachers should feel comfortable in using other strategies, materials, or activities that may already be in place or familiar to the teacher. The IAA Frameworks and the IAA itself will continue to be reviewed and adjusted as changes occur with the Illinois Standards and/or the regular assessment.

Grade 11 Priorities

State Goal 11

Scientific Inquiry (Standard A)

11.11.01 Understand and follow procedures relating to scientific investigations, including understanding the design and procedures used to test a hypothesis, organizing and analyzing data accurately and precisely, producing and interpreting data tables and graphs, performing appropriate calculations, applying basic statistical methods to the data, identifying appropriate conclusions, making predictions, and evaluating competing models.

Technological Design (Standard B)

11.11.07 Given test results on different models, choose the model which best solves the design problem.

State Goal 12

Living Things (Standard A)

Classification

12.11.03 Identify the following basic animal types by their common characteristics: sponges, cnidarians, flatworms and roundworms, mollusks, arthropods, echinoderms, invertebrate chordates, and invertebrates.

Cell Biology

12.11.04 Identify the similarities and differences between plant and animal cells (i.e., know the various fundamental organelles of plant and animal cells and be able to distinguish these organelles in diagrams).

Changes Over Time

12.11.25 Understand that natural selection acts on the phenotype, not the genotype, of an organism.

Environment and the Interaction of Living Things (Standard B)

12.11.31 Understand the causes of ecosystem disruptions: changes in climate, human activity, introduction of a non-native species, changes in population size, sudden natural disasters.

Matter and Energy (Standard C)

Properties of Matter

12.11.37 Identify the most familiar elements by name and some of their most familiar properties. Identify the chemical symbols for familiar elements.

12.11.47 Understand the different states of matter: solid, liquid, gas, plasma. Define freezing, melting, boiling, condensing, and sublimation.

Force and Motion (Standard 12D)

12.11.76 Understand simple machines and how they provide mechanical advantage. For example, know that a lever is like a balance and that to balance it requires weights (or forces) applied on each end to be in the inverse ratio to that of their distances from the fulcrum. Thus the mechanical advantage increases with greater distance from the fulcrum

Earth Science (Standard 12E)

The Atmosphere

12.11.99 Analyze weather conditions of an area, when given specific weather data.

Astronomy (Standard F)

12.11.102 Understand and describe the physical characteristics of galaxies and the objects within galaxies (e.g., stars, pulsars, black holes, planets, comets, asteroids). Describe physical characteristics of the sun (e.g., corona, prominences, sunspots, solar flares), and know that solar events can cause phenomenon such as auroras.

State Goal 13

Safety and Practices of Science (Standard A)

13.11.01 Understand basic rules of safety in conducting scientific experiments in a laboratory or in the field.

Science, Technology and Society (Standard 13B)

13.11.06 Analyze scientific breakthroughs in terms of societal and technological effects.

State Goal 11

Scientific Inquiry (Standard A)

11.11.01 Understand and follow procedures relating to scientific investigations, including understanding the design and procedures used to test a hypothesis, organizing and analyzing data correctly, producing and interpreting data tables and graphs, performing appropriate calculations, applying basic statistical methods to the data, identifying appropriate conclusions, making predictions, and evaluating competing models.

Level	Critical Function	Suggested General Education Activity	Suggested Modified Instructional Activity	Possible Assessment Activity 1	Possible Assessment Activity 2	Possible Assessment Activity 3
Grade 11	Predict cause and effect, organize and analyze data. Draw conclusions based upon data.	The teacher will review the procedures of conducting scientific investigations. The students will conduct an experiment involving celery stalk or carnation with stem in water. Using food coloring or dye in the water with different colors or concentrations of dye and/or salt, the student will record his or her observations.	The teacher will review the procedures of conducting scientific investigations. The students will conduct an experiment involving celery stalk or carnation with stem in water. Using food coloring or dye in the water with different colors or concentrations of dye and/or salt, the student will record his or her observations. For visually impaired students use salt instead of dye, so the student can feel the limp versus crisp stalk.	Given an overview of the scientific experiment in the instructional activities, the student will correctly predict a color change before dye is added to the water.	Given the scientific experiment in the instructional activities, the student will correctly explain the relationship between concentration of dye (or salt) and darkness of leaf (or stiffness of stalk).	Given the scientific experiment and its results in the instructional activities, the student will generalize the results to different plants or solutes.

State Goal 11

Scientific Inquiry (Standard B)
Technological Design

11.11.07 Given test results on different models, choose the model which best solves the design problem.

Level	Critical Function	Suggested General Education Activity	Suggested Modified Instructional Activity	Possible Assessment Activity 1	Possible Assessment Activity 2	Possible Assessment Activity 3
Grade 11	Use data and or observations to draw conclusions.	The teacher will review how to determine a design problem and then identify the model that best solves the problem. Given two or more silly putty “boats” that float, the student will test buoyancy using paper clips or other small objects, record observations and determine which model is best served for buoyancy.	The teacher will review how to determine a design problem and then identify the model that best solves the problem. Given two or more silly putty “boats” that float, the student will test buoyancy using paper clips or other small objects, record observations and determine which model is best served for buoyancy.	Given the experiment in the instructional activities, the student will identify the model that floats the best (i.e., holds the most paper clips).	Given data from the experiments, the student will predict the model that floats the best (i.e., holds the most paper clips) without observing the actual test being conducted, then conduct the experiment and identify the model that floats the best (i.e., holds the most paper clips).	Given data from the experiments, the student will identify the model that floats the best (i.e., holds the most paper clips) without observing the actual test being conducted.

State Goal 12

Living Things (Standard A)
Classification

12.11.03 Identify the following basic animal types by their common characteristics: sponges, cnidarians, flatworms and roundworms, mollusks, arthropods, echinoderms, invertebrate chordates, and invertebrates.

Level	Critical Function	Suggested General Education Activity	Suggested Modified Instructional Activity	Possible Assessment Activity 1	Possible Assessment Activity 2	Possible Assessment Activity 3
Grade 11	Place animal organisms in categories from simple to complex, based on common characteristics.	The teacher will review the common characteristic of the basic animal types and will provide a list of characteristics to the students. The students will classify unknown organisms using the basic animal types list of characteristics.	The teacher will review the common characteristic of the basic animal types and will provide a list of characteristics to the students. The teacher will provide pictures and three dimensional objects to classify more than one organism using at least two animal types. For example, compare an earthworm and human being.	Given a selected number of animal organisms, the student will identify whether or not the organism belongs in a given animal type or not.	Given a number of organisms, the student will classify the organisms within the correct kingdom.	Given a classification key, the student will identify all the characteristics of the given animal type.

State Goal 12

Living Things (Standard A)
Cell Biology

12.11.04 Identify the similarities and differences between plant and animal cells (i.e., know the various fundamental organelles of plant and animal cells and be able to distinguish these organelles in diagrams).

Level	Critical Function	Suggested General Education Activity	Suggested Modified Instructional Activity	Possible Assessment Activity 1	Possible Assessment Activity 2	Possible Assessment Activity 3
Grade 11	Identify similarities and differences between plant and animal cells.	The teacher will describe and explain the similarities and differences between plant and animal cells. The student will label several animal and plant cell diagrams and complete a table comparing and contrasting cell organelles.	The teacher will describe and explain the similarities and differences between plant and animal cells. Using plant and animal cell models, the student will duplicate a typical plant and animal cell. For example, use manipulatives, cut-outs and/or raised line drawings to construct a cell.	Given three or more organelles, the student will create a cell model.	Given a prompt, the student will create a plant and animal cell model.	Given a prompt, the student will identify the plant and animal organelles.

State Goal 12

Living Things (Standard 12A)
Change Over Time

12.11.25 Understand that natural selection acts on the phenotype, not the genotype, of an organism.

Level	Critical Function	Suggested General Education Activity	Suggested Modified Instructional Activity	Possible Assessment Activity 1	Possible Assessment Activity 2	Possible Assessment Activity 3
Grade 11	Understand that expressed traits determine an organism's ability to survive in its environment in order to reproduce its genetic makeup.	The teacher will use direct instruction and pictures to explain the ability of organisms to survive because of how they look. An example is a walking stick blending in with a branch on a tree or a moth blending in with the trunk of a tree. The students will look at pictures of animals and identify how they use camouflage in their environment.	Same as general education activity.	Given three pictures of animals in their natural environments, the student will identify the picture of the animal that is using camouflage in its environment.	Given three pictures of animals in their natural environments, the student will identify the picture of the animal that is using camouflage in its environment and will explain how this helps the animal survive.	Given a picture of an organism in its natural environment, the student will identify how the organism is using camouflage and will identify why some organisms survive and others do not.

State Goal 12

Environment and Interaction of Living Things (Standard 12B)
Ecology and Adaptation

12.11.31 Understand the causes of ecosystem disruptions: changes in climate, human activity, introduction of a non-native species, changes in population size, sudden natural disasters.

Level	Critical Function	Suggested General Education Activity	Suggested Modified Instructional Activity	Possible Assessment Activity 1	Possible Assessment Activity 2	Possible Assessment Activity 3
Grade 11	Understand that an ecosystem is a fragile environment subject to frequent change.	The teacher will review and discuss the causes of ecosystem disruptions. The class will create an aquarium ecosystem to realize the difficulty of maintaining an ideal environment for life and the students will observe and record interactions and changes over time.	The teacher will review and discuss the causes of ecosystem disruptions. The class will create an aquarium ecosystem to realize the difficulty of maintaining an ideal environment for life and the students will observe and record interactions and changes over time.	Given a prompt, the student will identify the plants and animals depicted in their diorama.	Given a prompt, the student will identify and create an environmental disaster.	Given a prompt, the student will identify and create an environmental disaster and explain the consequences of their environmental disaster.

State Goal 12

Matter and Energy (Standard 12C)
Properties of Matter

12.11.37 Identify the most familiar elements by name and some of their most familiar properties. Identify the chemical symbols for familiar elements.

Level	Critical Function	Suggested General Education Activity	Suggested Modified Instructional Activity	Possible Assessment Activity 1	Possible Assessment Activity 2	Possible Assessment Activity 3
Grade 11	Know the names and symbols of the most common elements.	The teacher will review familiar elements and their chemical symbols. The students will create a poster of the common elements displaying the element's name, symbol and atomic number.	The teacher will review familiar elements and their chemical symbols. The students will create a poster of the common elements displaying the element's name, symbol and atomic number.	Given one element, the student will match the element to its chemical symbol.	Given four familiar elements, the student will match the elements to their chemical symbols.	Given at least six familiar elements, the student will match the elements to their chemical symbols.

State Goal 12

Matter and Energy (Standard C)
Properties of Matter

12.11.47 Understand the different states of matter: solid, liquid, gas, plasma. Define freezing, melting, boiling, condensing, and sublimation.

Level	Critical Function	Suggested General Education Activity	Suggested Modified Instructional Activity	Possible Assessment Activity 1	Possible Assessment Activity 2	Possible Assessment Activity 3
Grade 11	Understand that matter exists in different phases and students need to understand the transformations between the phases.	The teacher will conduct an experiment with the class: Begin with a piece of ice, allow it to melt and then heat the liquid until it boils. The students will note and record temperature and physical changes during the changes in phase. As the water boils the teacher will place a piece of metal foil over the rising steam to allow the water to condensate back to the liquid phase. Finally, place liquid water in a freezer and let it return to the solid phase. The students will describe what happened during each state of matter.	The teacher will conduct an experiment with the class: Begin with a piece of ice, allow it to melt and then heat the liquid until it boils. The students will note and record temperature and physical changes during the changes in phase. As the water boils the teacher will place a piece of metal foil over the rising steam to allow the water to condensate back to the liquid phase. Finally, place liquid water in a freezer and let it return to the solid phase. The students will describe what happened during each state of matter.	Given the experiment in the instructional activities, the student will answer “yes” or “no” questions about the experiment.	Given the experiment in the instructional activities, the student will order the states of matter as they were observed in the experiment..	Given the experiment in the instructional activities, the student will identify temperature changes (hot / cold) as well as physical changes during the experiment.

State Goal 12

Force and Motion (Standard D)

12.11.76 Understand simple machines and how they provide mechanical advantage. For example, know that a lever is like a balance in debt to balance it requires weights (or forces) applied on each and to be in the inverse ratio to that of their distances from the fulcrum. Thus the mechanical advantage increases with greater distance from the fulcrum.

Level	Critical Function	Suggested General Education Activity	Suggested Modified Instructional Activity	Possible Assessment Activity 1	Possible Assessment Activity 2	Possible Assessment Activity 3
Grade 11	Understand that simple machines can be used to make work easier. Students should understand how simple machines function.	The teacher will demonstrate how a simple lever can be used to lift heavy objects by using a long sturdy 2x4 board and a bicycle rack; the simple lever will lift the bike rack. The students will indicate how to replicate the use of a lever.	The teacher will demonstrate how a simple lever can be used to lift heavy objects by using a long sturdy 2x4 board and a bicycle rack; the simple lever will lift the bike rack. The students will indicate how to replicate the use of a lever.	Given an object to be lifted and a choice of two ways of lifting it, the student will select the method that will require the lease amount of effort.	Given a prompt, the student will explain that the amount of effort needed to lift an object with a lever depends on the distance of the applied force from the fulcrum.	Given a prompt, the student will describe the uses of a lever in real world applications.

State Goal 12

Earth Science (Standard 12E)
The Atmosphere

12.11.99 Analyze weather conditions of an area, when given specific weather data.

Level	Critical Function	Suggested General Education Activity	Suggested Modified Instructional Activity	Possible Assessment Activity 1	Possible Assessment Activity 2	Possible Assessment Activity 3
Grade 11	Analyze weather data.	The teacher will explain and demonstrate how to read weather reports, good sources to find out about weather conditions and look at them over time. The students will practice using weather instruments, newspapers or other resources to review weather data and analyze weather conditions.	The teacher will explain and demonstrate how to read weather reports, good sources to find out about weather conditions and look at them over time. The students will practice using weather instruments, newspapers or other resources to review weather data and analyze weather conditions.	Given a weather report for the past week, the student will answer “yes” and “no” questions about the weather.	Given a weather report for the past month, the student will answer questions about the weather.	Given a weather report for the past month and for the same month for the past 2 years, the student will answer questions about the weather conditions for the area.

State Goal 12

Astronomy (Standard F)

12.11.102 Understand and describe the physical characteristics of galaxies and the objects within galaxies (e.g., stars, pulsars, black holes, planets, comets, asteroids). Describe physical characteristics of the sun (e.g., Corona, prominences, sunspots, solar flares), and know that solar events can cause phenomenon such as auroras.

Level	Critical Function	Suggested General Education Activity	Suggested Modified Instructional Activity	Possible Assessment Activity 1	Possible Assessment Activity 2	Possible Assessment Activity 3
Grade 11	Understand and describe the physical characteristics of galaxies and the objects within galaxies.	The teacher will describe and provide illustrations of objects in the galaxy. The students will then partner and research each of these objects and report to the class.	The teacher will describe and provide illustrations of objects in the galaxy. The students will then partner and research each of these objects and report a fact and a picture of the object to the class.	Given a replica of the Earth and a comet, the student will indicate which is a planet.	Given a teacher prompt, the student will name one characteristic of a planet and one characteristic of the sun.	Given a teacher prompt, the student will name one characteristic of a planet, one characteristic of an asteroid, and one characteristic of the sun.

State Goal 12

Safety and Practices of Science (Standard 13A)

13.11.01 Understand basic rules of safety in conducting scientific experiments in a laboratory or in the field.

Level	Critical Function	Suggested General Education Activity	Suggested Modified Instructional Activity	Possible Assessment Activity 1	Possible Assessment Activity 2	Possible Assessment Activity 3
Grade 11	Understand the basic rules of **safety** in conducting scientific experiments in a laboratory or in the field.	The teacher will provide direct instruction on the safety procedures to be used while in the laboratory. The students will create and post a poster of classroom safety rules.	The teacher will provide direct instruction on the safety procedures to be used while in the laboratory. The students will create and post a poster of classroom safety rules.	Given a teacher prompt, the student will identify one rule of safety, from a choice of a rule and a nonrule.	Given a teacher prompt, the student will identify at least two rules of safety.	Given a teacher prompt, the student will identify at least two rules of safety and explain why they are important.

State Goal 12

Science, Technology, and Society (Standard 13B)

13.11.06 Analyze scientific breakthroughs in terms of societal and technological effects.

Level	Critical Function	Suggested General Education Activity	Suggested Modified Instructional Activity	Possible Assessment Activity 1	Possible Assessment Activity 2	Possible Assessment Activity 3
Grade 11	Understand that scientific breakthroughs impact on society.	The teacher will describe the role of scientific breakthroughs in society and describe some. The students will use available resources to study how scientific breakthroughs have had major impacts on society. An example would be the development of the internet by CERN for scientific research.	The teacher will describe the role of scientific breakthroughs in society and describe some. The students will use available resources to study how scientific breakthroughs have had major impacts on society.	Given a teacher prompt, the student will identify one scientific invention used in their homes.	Given a teacher prompt, the student will identify one scientific invention used in his or her home and indicate the impact of the device in the home.	Given a teacher prompt, the student will identify one scientific invention used in his or her home and identify the impact of the device both at home, and community.