

**(E) Teacher Resource. Reflect Rubric**

You will know the level to which your students have achieved the Learning Outcomes, and thus the Instructional Objective(s), by using the suggested Rubrics below.

Instructional Objective 1: To construct a simple model according to criteria**National Science Education Standards (NSES)****(E) Science and Technology: Identify Appropriate Problems**

Students should develop their abilities by identifying a specified need, considering its various aspects, and talking to different potential users or beneficiaries. They should appreciate that for some needs, the cultural backgrounds and beliefs of different groups can affect the criteria for a suitable product. (Grades 5-8: E1a)

	Expert	Proficient	Intermediate	Beginner
LO1a: Classify pros and cons of community in Venn Diagram	Numerous, relevant, & insightful pros and cons are all categorized correctly	Numerous, relevant pros and cons are all categorized correctly	Numerous pros and cons are mostly categorized correctly	Very few pros and cons are categorized correctly, or are not relevant
LO1b: Identify Criteria	Brainstorming ticket includes numerous, relevant, & insightful resources & needs	Brainstorming ticket includes numerous & relevant resources & needs	Brainstorming ticket includes numerous resources & need, although some are not clearly relevant	Brainstorming ticket includes very few relevant resources & needs

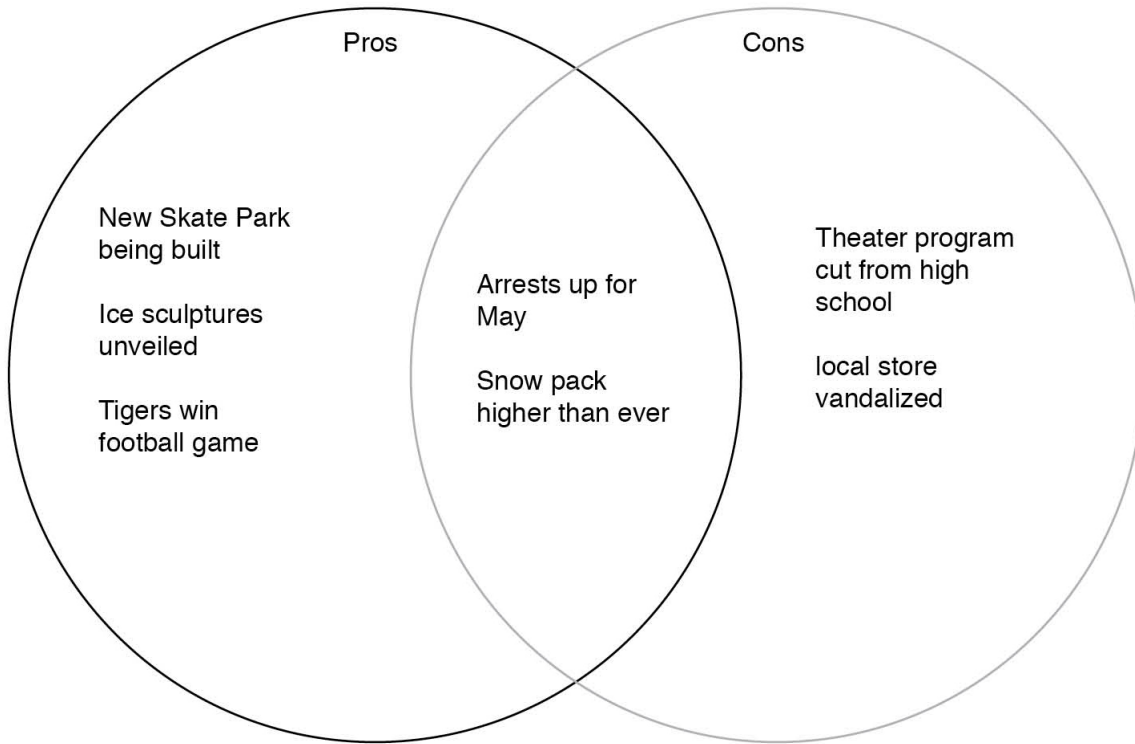
(E) Science and Technology: Evaluate Completed Technological Designs or Products

Students should use criteria relevant to the original purpose or need, consider a variety of factors that might affect acceptability and suitability for intended users or beneficiaries, and develop measures of quality with respect to such criteria and factors; they should also suggest improvements and, for their own products, try proposed modifications. (Grades 5-8: E1d)

	Expert	Proficient	Intermediate	Beginner
LO1c: Plan, using criteria	Plan meets all criteria in an innovative way.	Plan meets all criteria.	Plan mostly meets criteria.	Plan does not meet criteria.
LO1d: Evaluate model community	Evaluation includes complete list of thoughtful items to include & exclude based on Venn Diagram list	Evaluation includes complete list of items to include & exclude based on Venn Diagram list	Evaluation includes list of items to include & exclude based on Venn Diagram list	Evaluation includes very few items to include & exclude based on Venn Diagram list

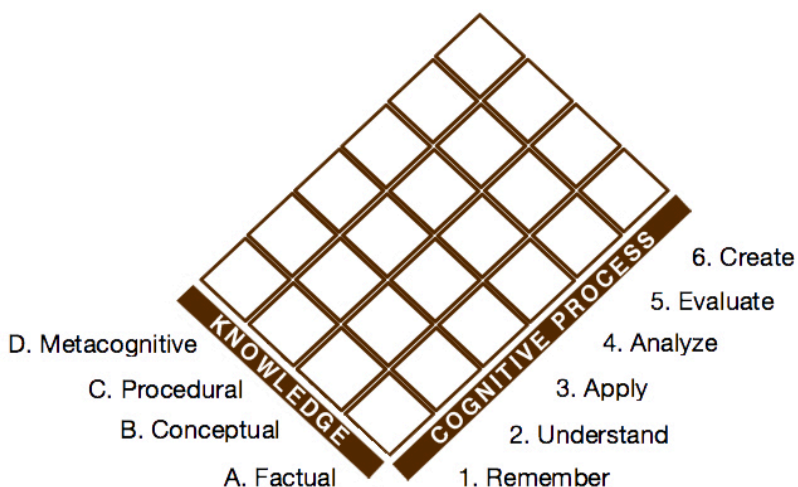


(F) Teacher Example. Community Venn Diagram – relates to Student Worksheet (A)





(G) Teacher Resource. Placement of Instructional Objective and Learning Outcomes in Taxonomy (1 of 3)



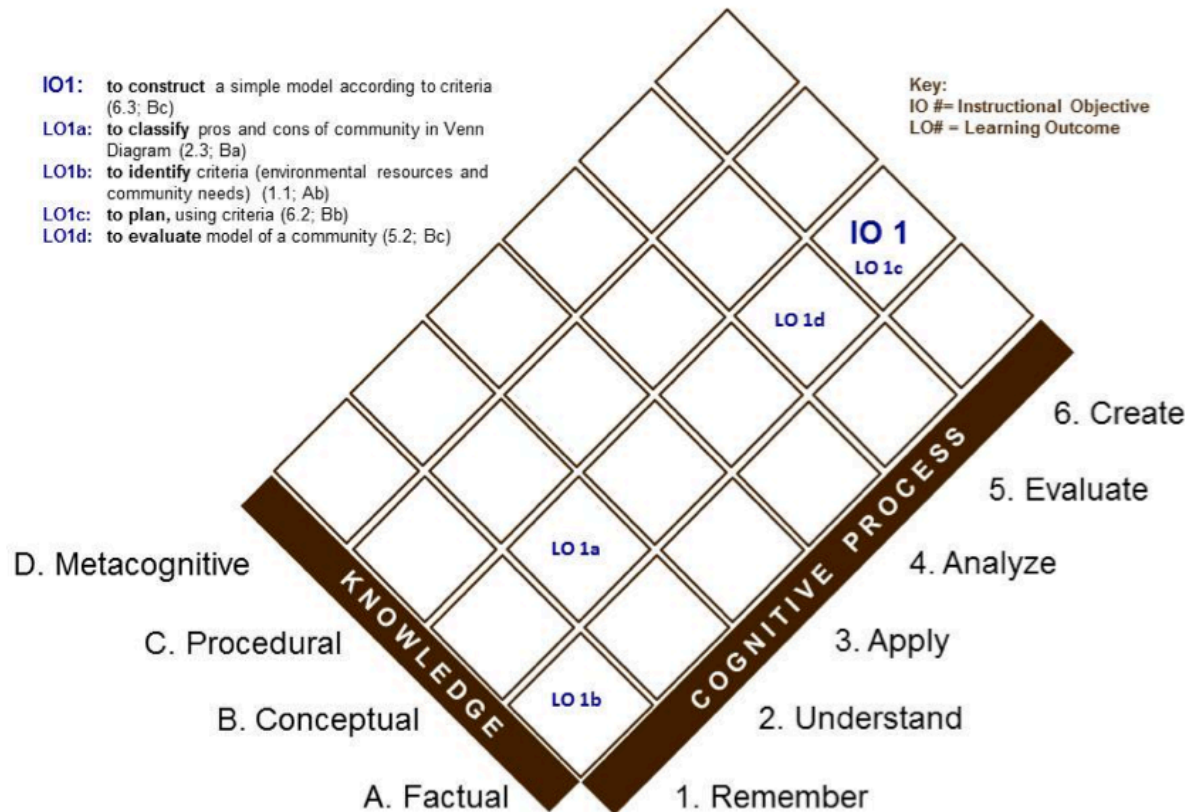
This lesson adapts Anderson and Krathwohl's (2001) taxonomy, which has two domains: Knowledge and Cognitive Process, each with types and subtypes (listed below). Verbs for objectives and outcomes in this lesson align with the suggested knowledge and cognitive process area and are mapped on the next page(s). Activity procedures and assessments are designed to support the target knowledge/cognitive process.

Knowledge	Cognitive Process
A. Factual Aa: Knowledge of Terminology Ab: Knowledge of Specific Details & Elements B. Conceptual Ba: Knowledge of classifications and categories Bb: Knowledge of principles and generalizations Bc: Knowledge of theories, models, and structures C. Procedural Ca: Knowledge of subject-specific skills and algorithms Cb: Knowledge of subject-specific techniques and methods Cc: Knowledge of criteria for determining when to use appropriate procedures D. Metacognitive Da: Strategic Knowledge Db: Knowledge about cognitive tasks, including appropriate contextual and conditional knowledge Dc: Self-knowledge	1. Remember 1.1 Recognizing (Identifying) 1.2 Recalling (Retrieving) 2. Understand 2.1 Interpreting (Clarifying, Paraphrasing, Representing, Translating) 2.2 Exemplifying (Illustrating, Instantiating) 2.3 Classifying (Categorizing, Subsuming) 2.4 Summarizing (Abstracting, Generalizing) 2.5 Inferring (Concluding, Extrapolating, Interpolating, Predicting) 2.6 Comparing (Contrasting, Mapping, Matching) 2.7 Explaining (Constructing models) 3. Apply 3.1 Executing (Carrying out) 3.2 Implementing (Using) 4. Analyze 4.1 Differentiating (Discriminating, distinguishing, focusing, selecting) 4.2 Organizing (Finding coherence, integrating, outlining, parsing, structuring) 4.3 Attributing (Deconstructing) 5. Evaluate 5.1 Checking (Coordinating, Detecting, Monitoring, Testing) 5.2 Critiquing (Judging) 6. Create 6.1 Generating (Hypothesizing) 6.2 Planning (Designing) 6.3 Producing (Constructing)



(G) Teacher Resource. Placement of Instructional Objective and Learning Outcomes in Taxonomy (2 of 3)

The design of this activity leverages Anderson & Krathwohl’s (2001) taxonomy as a framework. Pedagogically, it is important to ensure that objectives and outcomes are written to match the knowledge and cognitive process students are intended to acquire.



**(G) Teacher Resource. Placement of Instructional Objective and Learning Outcomes in Taxonomy (3 of 3)**

The design of this activity leverages Anderson & Krathwohl's (2001) taxonomy as a framework. Below are the knowledge and cognitive process types students are intended to acquire per the instructional objective(s) and learning outcomes written for this lesson. The specific, scaffolded 5E steps in this lesson (see Section 5.0 *Procedures*) and the formative assessments (worksheets in the Student Guide and rubrics in the Teacher Guide) are written to support those instructional objective(s) and learning outcomes. Refer to (G, 1 of 3) for the full list of categories in the taxonomy from which the following were selected. The prior page (G, 2 of 3) provides a visual description of the placement of learning outcomes that enable the overall instructional objective(s) to be met.

At the end of the lesson, students will be able

IO1: to construct a simple model**6.3:** to construct**Bc:** knowledge of theories, models, and structures

To meet that instructional objective, students will demonstrate the abilities:

LO1a: to classify pros and cons

2.3: to classify

Ba: knowledge of classifications and categories

LO1b: to identify criteria

1.1: to identify

Ab: knowledge of specific details and elements

LO1c: to plan using criteria

6.2: to plan

Bb: knowledge of principles and generalizations

LO1d: to evaluate model community

5.2: to critique

Bc: knowledge of theories, models, and structures