Odyssey of the Mind and Educational Initiatives

	STEM Initiatives				Common Core Standards	21st Century Skills
	Science	**Technology**	**Engineering**	**Mathematics**		
Problem 1 (vehicle) **Ooh-Motional Vehicle** The problem requires teams to design, build, and drive a vehicle that will travel a course where it will encounter three different situations. The vehicle will display a different human emotion for each encounter and one will cause it to travel in reverse. The team will create a theme for the presentation that incorporates the vehicle and the different emotions. The emphases will be on the technical risk-taking and creativity of the vehicle's engineering for travel and change of emotional appearance.	Energy Energy sources Propulsion Hybrids Simple machines Energy efficiency Mechanics Steering Braking Friction Inertia	Designs Building Mechanics Steering Braking Reverse Engineering the emotions	Apply their knowledge of science, technology, engineering, and mathematics to define, analyze, and solve problems Apply contemporary engineering tools in the application of science, mathematics and technology to define analyze, model and prototype solutions to problems. *e.g., the vehicle must have one or two propulsion systems that use two different types of energy to propel it.*	Understanding weight distribution Estimation Spatial relationships Measuring materials Ratio Probability Computation skills	Accuracy Research Analyze and evaluate Communication skills Brainstorming techniques Writing script Problem solving Divergent thinking	**Global Awareness** Global competitiveness and understanding Teams meet other teams from around the works and the annual World Finals **Intellectual curiosity** Research to find information needed to solve the problem Choosing a problem and idea that is personally exciting **Interpersonal and Collaborative Skills Communication** Teamwork: consensus, collaboration, communication Understanding and valuing the power of diversity within the team Understanding personal strengths and weaknesses Practicing active
Problem 2 (technical) **Weird Science** The team will create and present a performance about a team of scientists on an expedition to uncover the cause of mysterious events. The team will select the location of the expedition from NASA Earth Observatory Photographs. The scientists will collect two samples and will report on their findings. The performance will also include a technical	Students must use existing background knowledge or develop new knowledge of climate and environmental phenomenon to create a mechanical representation of a chosen event.	The teams must incorporate technical representations and must utilize NASA's website: **http://earthobservatory.nasa.gov/odysseyofthemind/event_selector.php**. to develop explanations for mysterious events that happen on earth. Use knowledge of	Apply contemporary engineering tools, including mechanical elements, in the application of science, mathematics and technology to develop a team-created device which will be evaluated based on functional design and operation.	Use of basic algebra and geometry mathematics to create technical representations of the problem solution. Demonstrate basic math skills to determine scoring outcomes based on criteria of solution to be judged.		

representation of the mysterious events, a moving backdrop that helps portray traveling, and a team-created device that the scientists use on the expedition.		geography and mapping skills to synthesize information provided in NASA photographs.				listening skills Learning to value other team member's ideas and contributions **Problem Solving & Creative and Critical Thinking** Analyze complex open-ended real world problems Identifying challenges within the problem Brainstorm possible technical solutions Brainstorm possible thematic and artistic solutions Evaluate potential solutions – How creative is this solution? Will other teams have thought of this? Spontaneous: training your mind to generate creative solutions by analyzing and evaluation your ideas and learning to use targeted thinking strategies. **Self-Direction** No outside assistance rule: teams generated research, solutions and decision making
Problem 3 (classical) **To Be or Not to Be** In this Classics problem, teams will put a musical theatre spin on one of William Shakespeare's most famous lines: "To Be Or Not To Be." Hamlet, the title character, ponders this question and realizes that the easy way out is not always the correct choice. An original "Hamlet" character will face a team-created dilemma. Unlike Shakespeare's Hamlet, the team's character will take the easy way out only to discover that it was the wrong choice. Teams will also incorporate a character that portrays Hamlet's conscience, a creative scene change, a creative costume change, and use of a "trap door." A portion of the performance will include musical theatre elements.	Scientific Method Principles of engineering design Materials Trap (i.e., physics) Scene changes Assessment/eval/rewor Environmental element of travel	Scene change Principles of engineering design How music is presented Assess/eval/rework Travel simulation replicating technology	Design a set that changes within the given limitations. Trap door Principles of Engineering design Materials How scene changes Assess/eval/rework Choosing characters Selecting style categories (fit in big picture) System Design to plan out and solve the whole problem (as well as its parts).	Probability Time element Music composition Scene change: Spatial relationships Assess/eval/rework Cost form		
Problem 4 (structure) **You Make the Call** For this problem, teams will design and build a structure made of only balsa wood and glue that will balance and support as much weight as possible. The structure may have a maximum weight of 9	Research/understand material properties of balsa and various adhesives. Understand effects of various environments on materials. Understand how	Apply the process of design. Utilize technology in research and design in all aspects of the solution, including the machine, the structure and props/scenery.	Apply their knowledge of science, technology, engineering, and mathematics to define, analyze, and solve problems. Apply contemporary engineering tools in	Students will employ metric and standard measurement in The team creates or operates a device that will perform or demonstrate a mathematical		

grams and will receive 2 times the weight held, or 12 grams and receive 1½ times the weight held, or 15 grams and receive the actual weight held. The testing of the structure will be presented in a performance that includes mathematics in its theme.	design of structure affects weight transfer; how weight placement impacts performance. Evaluate safety issues involved with materials being used in construction of structure, set and mathematical device; and structural collapse	Observe how design of structure affects weight transfer; how weight placement impacts performance. Utilize various technologies in research and construction of mathematical device, sets, props that are relative to options for problem solution.	the application of science, mathematics and technology to define, analyze, model, and build prototype solutions to problems. Solving for which structure/weight metric to utilize (light, medium or heavy structure). Applying a structured approach to solving problems; defining a problem, brainstorming, research, identify criteria, explore the possibilities, make a model, evaluate, communicate results, revise to improve performance. Evaluate structural characteristics of materials and connections. Evaluate material/chemical (adhesive) connections – surface area of joining pieces, geometry of joints.	function. Team must work within budgetary and stage parameters. Measure design of structure affects weight transfer; how weight placement impacts performance. Analyze scoring matrix for maximizing points of structure, device, set, costume, and performance.		Select potential solutions using scoring criteria Planning for tournaments **Authentic Assessment Accountability and Adaptability** Team reflection of effectiveness during spontaneous practice Team reflection of tournament results Planning and refining for future tournaments Create-test-improve-re-test best solution
Problem 5 (performance) Odyssey Angels The team will create and present a performance where a group of students travel throughout one or more team-created places where they encounter negative situations. These "Odyssey Angels" change what they find and turn them into positive situations. On their journey, they help	*Ex.: Invention of an alternative means of communication*	Use of technology in research Special power might involve technology	Opportunity to build props Special power might involve engineering	Budgeting for cost limitation Measuring Time		

two individuals with different problems and help save an entire community from a bad situation. One Odyssey Angel cannot speak, and another has a special team-created power.						
Primary **Hide and Peek** The team is to create a device that uncovers three surprise objects by lifting a team-decorated container off of each of them from 5, 8 and 10 feet away. The containers may be raised at any time, in any order, and may be raised simultaneously. The demonstration of the solution will be presented during a performance that integrates raising the containers and the surprise objects in its theme. There will be a narrator character and a setting.	Apply a structured approach to solving problems including: defining a problem, brainstorming, researching and generating ideas, identifying criteria and constraints, exploring possibilities, making a model or prototype, evaluating the design using specifications and communicating results.	Teams will gain electronic access to world-wide resources to build the knowledge they need to assemble the solution to their problem.	Apply their knowledge of science, technology, engineering, and mathematics to define, analyze, and solve problems. Specifically, teams will raise a container from a distance with something they have built themselves, by exploring simple machinery.	Teams need to measure distances to the boxes, and the containers themselves to sufficiently cover the hidden objects in the problem.		
Spontaneous	Innovation, aspects of gravity, physics, composition of materials, testing hypotheses, evaluation of results	Innovation, creative use of materials	Brainstorming, defined roles of team members, separating the problem into its components, defining the problem, communications, understanding the skills of individual team members that enhance problem resolution	Time management, scoring, probability, logic, knowledge acquired in one subject can be used in another		