



**Odyssey of the Mind**<sup>®</sup>  
The beyond the box experience.

# How OM Meets STEM & 21<sup>st</sup> Century Skills Initiatives



## PROBLEM 1: Drive-In Movie

OM teams get the best seat in the house as they visit a drive-in and even become part of the movie being played! In this problem, teams will design, build, and run a vehicle with a team-created rider that travels to a drive-in theater. In the performance, the movie takes place all around the vehicle when suddenly a team-created special-effect occurs on the vehicle that makes it seem to become part of the action! It will include a lead actor character along with all the fun that comes with this nostalgic outdoor movie experience.



Science	Technology	Engineering	Mathematics
Understand the properties of objects and materials, and the changes in properties and matter in order to create one vehicle and its method of propulsion.	Use technology tools to enhance learning, increase productivity, and promote creativity.	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	Use visualization, spatial reasoning, and geometric modeling to solve problems in the creation of the vehicle and propulsion systems, etc.
Research/understand energy, its sources, and how it applies to different propulsion systems.	Research different methods of control, steering, and propulsion in designing and building the vehicle.	Apply a structured approach to solving problems: define problem, brainstorm ideas, research, identify criteria, explore the possibilities, make a model, evaluate, communicate results, and revise to improve performance.	Utilize estimation, measurement, computational skills, and spatial/geometric relationships in order to: <ul style="list-style-type: none"> <li>(a) Work within budgetary, time, and space limitations.</li> <li>(b) Analyze scoring criteria to prioritize problem elements such as vehicle and design, and propulsion systems.</li> </ul>
Research/understand simple machines, transmissions, leverage, mechanics of motion, inertia, friction, braking.	Research different sources of energy for vehicle's propulsion.	Develop an understanding that engineers need to communicate effectively as individuals and as members of a team.	Solve real-world and mathematical problems involving area, surface area, and volume.
Research/understand the construction and materials in the design of vehicles and propulsion systems.	Use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.	Design, test and build systems, components, or processes to meet desired needs within realistic constraints as they relate to vehicles, propulsion systems, obstacles, etc.	Use digital tools and/or mathematical concepts and arguments to test and compare proposed solutions to an engineering design problem.
Apply scientific principles to design, construct, and test a device that either minimizes or maximizes energy transfer.	Demonstrate the ability to use technology for research, critical thinking, decision making, communication and collaboration, creativity and innovation.	Evaluate competing design solutions based on jointly developed and agreed-upon design criteria.	
Research/understand simple reactions and their outcomes.			



## PROBLEM 2: AI Tech-NO-Art

They say beauty is in the eye of the beholder, but what if the beholder is a robot? In this problem OM teams will design, build, and operate an Artificial Intelligence Tech-NO-Art device that determines if a work of art is beautiful or not. It will dismantle a work of art that it decides is not beautiful to create a new work of art it believes is beautiful. The humorous performance will also include an artist character who stands up for their work of art, sound effects, and team-created artwork.



Science	Technology	Engineering	Mathematics
Understand the properties of objects and materials, and the changes of properties in matter in order to create devices.	Use technology tools to enhance learning, increase productivity, and promote creativity.	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	Use visualization, spatial reasoning, and geometric modeling to solve problems in the creation of devices to complete tasks.
Research and develop an understanding of how energy may be used to power devices.	Use productivity tools to collaborate in constructing technology-enhanced models.	Apply a structured approach to solving problems: define problem, brainstorm ideas, research, identify criteria, explore the possibilities, make a model, evaluate, communicate results, and revise to improve performance.	Utilize estimation, measurement, computational skills, and spatial relationships in order to: <ol style="list-style-type: none"> <li>Work within budgetary, time, and space limitations.</li> <li>Explore multiple ways an animated creature might be able to change appearance.</li> <li>Analyze scoring criteria to prioritize problem elements such as quality and creativity of the performance, creativity of engineering of how the creature changes appearance and completes tasks, and the originality and effectiveness of the searcher character.</li> </ol>
Research and develop an understanding of simple machines, leverage, laws of motion, mechanics, and the effect of applied force on objects to complete the tasks.	Employ technology in the development of strategies for solving problems in the real world.	Develop an understanding that engineers need to communicate effectively as individuals and as members of a team.	
Research/understand simple reactions and their outcomes.	Understand and use technology systems.	Design, create and build a solution in which an animated creature can change appearance and complete tasks.	
	Use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.		



### PROBLEM 3: *Classics...Opening Night Antics*

There is a saying in the theatre that no matter what happens during a performance, the show must go on. The same is true in OM! For this problem, teams will portray the Opening Night of an original play based on the theme of a classic story. The Opening Night performance will not go as planned and will include a set malfunction, unexpected sound effects, a team-created antic and a theatre critic. Despite the Opening Night Antics, the show is a success!



Science	Technology	Engineering	Mathematics
Understand the properties of objects and materials, and the changes of properties in matter in order to design the “recreation”.	Use technology tools to enhance learning, increase productivity, and promote creativity.	Design, test, and build a system, component, or process to meet desired needs within realistic constraints.	Use visualization, spatial reasoning, and geometric modeling to solve problems in the “recreation.”
Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	Use productivity tools to collaborate in constructing creative works.	Apply the engineering design process, troubleshooting, research and development, invention and innovation, and experimentation in problem solving and engineering design.	Utilize estimation, measurement, computational skills, and spatial/geometric relationships in order to: <ul style="list-style-type: none"> <li>(a) Work within budgetary, time, and space limitations.</li> <li>(b) Analyze scoring criteria to prioritize problem elements such as the team-created court, the historic royal court, the team created instrument, etc.</li> </ul>
Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.	Know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts, and solving authentic problems.	Use engineering as a vehicle for creative and critical thinking and inquiry.	Use digital tools and/or mathematical concepts and arguments to test and compare proposed solutions to an engineering design problem.
Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.	Communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models, or simulations.	Develop an understanding that engineers need to communicate effectively as individuals and as members of a team.	Look closely to discern a pattern or structure.
Develop a diagram or simple physical prototype to convey a proposed object, tool, or process.	Utilize technology in research and design in all aspects of the solution.	Undertake a design project, engaging in the design cycle, to construct and/or implement a solution that meets specific design criteria and constraints.	
		Evaluate competing design solutions based on jointly developed and agreed-upon design criteria.	



## PROBLEM 4: Deep Space Structure

The universe is full of mysteries we hope to discover and some we may not want to discover! In this problem, teams unravel an original mystery by portraying a balsa wood structure discovered in deep space. The structure will be examined, tested, interviewed, and observed. The performance will include an actual balsa wood and glue structure that is tested to balance and support weight, a character portraying the discovered deep space structure, and the scientists studying it.



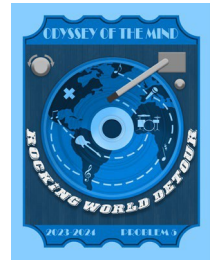
Science	Technology	Engineering	Mathematics
Understand the properties of objects and materials, and the changes in properties and matter in order to create weight-bearing structures.	Use technology tools to enhance learning, increase productivity, and promote creativity.	Apply a structured approach to solving problems: define problem, brainstorm ideas, research, identify criteria, explore the possibilities, make a model, evaluate, communicate results, and revise to improve performance.	Use visualization, spatial reasoning, and geometric modeling to solve problems in the creation a balsa wood structure.
Research and understand material properties of balsa and various adhesives.	Use productivity tools to collaborate in constructing technology-enhanced models and produce other creative works.	Develop an understanding that engineers need to communicate effectively as individuals and as members of a team.	Utilize geometry and trigonometry to analyze component structures and how those components will be stacked as the final structure.
Understand effects of various environments on materials.	Utilize technology in research and design in all aspects of the solution.	Apply contemporary engineering tools and technology to define, analyze, model, and build prototype structures made of multiple, separate components.	Utilize estimation, measurement, computational skills, and spatial relationships in order to: <ul style="list-style-type: none"> <li>(a) Work within budgetary, time, and space limitations.</li> <li>(b) Analyze scoring criteria to prioritize problem elements such as weight held, creativity of the performance, etc.</li> </ul> Use digital tools and/or mathematical concepts and arguments to test and compare proposed solutions to an engineering design problem.
Understand how design of a structure affects weight transfer through the structure and how weight placement impacts the ability to hold weight without collapsing.	Use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.	Evaluate structural characteristics of balsa wood and glued connections.	
Evaluate safety issues involved with materials being used in construction of the structure, particularly relating to structural collapse.	Demonstrate the ability to use technology for research, critical thinking, decision making, communication and collaboration, creativity and innovation.	Evaluate connections – surface area of joining pieces, geometry of joints.	



## PROBLEM 5: Rocking World Detour

Are you ready to rock? Here is your opportunity with this problem. OM teams will create a performance about a Rock Band on tour. Things get derailed in a very Odyssey way-while playing a song, a band is transported to an unexpected location. The band members must figure out how to use music to get them back on tour. The performance will also include band merchandise and original hairstyles.

This problem is sponsored by **ARM & HAMMER™**.

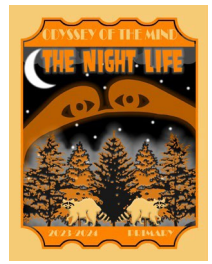


Science	Technology	Engineering	Mathematics
Understand the abilities of technological design.	Use technology tools to enhance learning, increase productivity, and promote creativity.	Design, test, and build a system, component, or process to meet desired needs within realistic constraints.	Make decisions about units and scales that are appropriate for problem situations involving measurement in order to design attention-getting effects.
Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	Use productivity tools to collaborate in constructing technology-enhanced models and produce other creative works.	Apply the engineering design process, troubleshooting, research and development, invention and innovation, and experimentation in problem solving and engineering design.	Utilize estimation, measurement, computational skills, and spatial relationships in order to: <ul style="list-style-type: none"> <li>(a) Work within budgetary, time, and space limitations.</li> <li>(b) Analyze scoring criteria to prioritize problem elements.</li> </ul>
Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.	Employ technology in the development of strategies for solving problems in the real world, including those related to social situations.	Use engineering as a vehicle for creative and critical thinking and inquiry.	Use digital tools and/or mathematical concepts and arguments to test and compare proposed solutions to an engineering design problem.
Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.	Communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models, or simulations to create attention-getting effects.	Develop an understanding that engineers need to communicate effectively as individuals and as members of a team.	Look closely to discern a pattern or structure.
Develop a diagram or simple physical prototype to convey a proposed object, tool, or process.		Undertake a design project, engaging in the design cycle, to construct and/or implement a solution that meets specific design criteria and constraints. Evaluate competing design solutions based on jointly developed and agreed-upon design criteria.	



## PRIMARY PROBLEM (Grades K-12): The Night Life

When most people are sleeping, there is a whole new world that comes to life in the night. In this problem teams will create and present a performance about an explorer character that searches for things in nature that "wake up" at nighttime. It will also include a team-created original discovery, something that lights up, and a team member in costume that represents a nocturnal animal.



Science	Technology	Engineering	Mathematics
<p>Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.</p> <p>Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.</p>	<p>Use technology tools to enhance learning, increase productivity, and promote creativity.</p> <p>Use productivity tools to collaborate in constructing technology-enhanced models of various displays other creative works.</p>	<p>Design, test, and build a system, component, or process to meet desired needs within realistic constraints.</p> <p>Apply the engineering design process, troubleshooting, research and development, invention and innovation, and experimentation in problem solving and engineering design.</p>	<p>Use visualization, spatial reasoning, and geometric modeling to solve problems in the creation of various features, exhibits and displays.</p> <p>Utilize estimation, measurement, computational skills, and spatial relationships in order to:</p> <ul style="list-style-type: none"> <li>(a) Work within budgetary, time, and space limitations.</li> <li>(b) Analyze scoring criteria to prioritize problem elements such as creativity, presentation quality, display use and impact, performance, humor, and character.</li> </ul>
<p>Ask questions, make observations, and gather information about a situation.</p>	<p>Employ technology in the development of strategies for solving problems in the real world.</p>	<p>Use engineering as a vehicle for creative and critical thinking and inquiry.</p>	
<p>Research/understand energy, its sources, and how it applies to different propulsion systems.</p>	<p>Understand and use technology systems.</p>	<p>Develop an understanding that engineers need to communicate effectively as individuals and as members of a team.</p>	
<p>Research/understand simple machines, transmissions, leverage, mechanics of motion, inertia, friction, braking.</p>		<p>Recognize design is a creative process and everyone can design solutions to problems.</p>	



## SPONTANEOUS:

Spontaneous is the “short term” portion of Odyssey of the Mind, in which students are given a problem and must solve it in a given amount of time, on the spot. Some spontaneous problems build verbal skills, some build mechanical skills, and some build both; all help improve problem solving skills. Spontaneous problems vary from hands-on problems (e.g., use materials to build/design/change an item), to verbal problems (e.g., name types of trees).

Science	Technology	Engineering	Mathematics
Use innovation to solve problems.	Utilize innovation in the creative use of everyday objects (e.g., toothpicks, clay, and paper plates) as tools and materials to solve problems.	Apply knowledge of science, technology, engineering, and mathematics to define, analyze, and solve problems	Utilize estimation, measurement, computational skills, and spatial relationships in order to: (a) Work within time and space limitations outlined in the problem.
Apply an intuitive understanding of gravity, motion, force, and other physics concepts.	Implement nontraditional communication methods (gestures, tapping on table) to brainstorm and solve problems.	Utilize engineering design process to define roles of team members (who will build, who will keep track of time), brainstorm (what materials will be used, how will solution be presented), and communicate possible solutions, and to reflect upon outcomes.	Analyze scoring criteria (what is worth the most points) to prioritize problem elements (what should we do first to get a higher score?)
Apply an understanding of the composition, properties, and creative use of materials. (e.g., what can we use to support the structure, what can we use to make it taller, etc.)		Develop an understanding that engineers need to communicate effectively as individuals and as members of a team.	
Test alternate hypotheses. (e.g., what is another way to build this?)		Evaluate competing design solutions based on jointly developed and agreed-upon design criteria.	
Evaluate results.			
Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.			



# Odyssey of the Mind and Educational Initiatives

## 21<sup>st</sup> Century Skills

21 <sup>st</sup> Century Skills	Odyssey Teams
<b>Global Awareness</b>	<ul style="list-style-type: none"> <li>• Global competitiveness and understanding.</li> <li>• Teams meet other teams from around the world at the annual World Finals.</li> </ul>
<b>Intellectual Curiosity</b>	<ul style="list-style-type: none"> <li>• Research to find information needed to solve the problem. Choosing a problem and idea that is personally exciting.</li> </ul>
<b>Interpersonal and Collaborative Skills Communication</b>	<ul style="list-style-type: none"> <li>• Teamwork: consensus, collaboration, communication. Understanding and valuing the power of diversity within the team. Understanding personal strengths and weaknesses.</li> <li>• Practicing active listening skills.</li> <li>• Learning to value other team member’s ideas and contributions.</li> </ul>
<b>Problem Solving &amp; Creative and Critical Thinking</b>	<ul style="list-style-type: none"> <li>• Analyze complex open-ended real-world problems. Identifying challenges within the problem.</li> <li>• Brainstorm possible technical solutions. Brainstorm possible thematic and artistic solutions.</li> <li>• Evaluate potential solutions – How creative is this solution? Will other teams have thought of this?</li> <li>• Spontaneous: training your mind to generate creative solutions by analyzing and evaluation your ideas and learning to use targeted thinking strategies.</li> </ul>
<b>Self-Direction</b>	<ul style="list-style-type: none"> <li>• No outside assistance rule: teams generated research, solutions and decision making. Select potential solutions using scoring criteria.</li> <li>• Planning for tournaments.</li> </ul>
<b>Authentic Assessment Accountability and Adaptability</b>	<ul style="list-style-type: none"> <li>• Team reflection of effectiveness during spontaneous practice. Team reflection of tournament results.</li> <li>• Planning and refining for future tournaments. Create-test-improve-retest best solutions.</li> </ul>

# Odyssey of the Mind and Educational Initiatives

## Art Standards

Dance	Music	Theater	Visual Arts	Media Arts
Identify ideas for choreography generated from a variety of stimuli	Generate a simple rhythmic, melodic, and harmonic phrase within AB and ABA forms that convey expressive intent	With prompting, and support, invent and inhabit an imaginary elsewhere in dramatic play or guided drama experience	Demonstrate willingness to experiment, innovate, and take risks to pursue ideas, forms, and meaning that emerge in the process of art-making or designing	Formulate variations of goals and solutions for media artworks by practicing chosen creative processes, such as sketching, improvising, and brainstorming
Construct and solve multiple movement problems to develop choreographic content	Generate musical ideas (rhythms, melodies, and accompaniment patterns)	Investigate multiple perspectives and solutions to staging challenges in a drama/theatre work	Brainstorm multiple approaches to a creative art or design problem	Organize, propose, and evaluate artistic ideas, plans, prototypes, and production processes for media arts productions, considering purposeful intent
Improve a series of movements that have a beginning, middle, and end	Demonstrate selected and organized musical ideas for an improvisation, arrangement, or composition to express intent and explain connection to purpose and context	Collaborate with peers to conceptualize scenery in a guided drama experience	Collaboratively set goals and create artwork that is meaningful and has purpose to the makers	Experiment with multiple approaches to produce content and components for determined purpose and meaning in media arts productions, utilizing a range of associated principles, such as point of view and perspective
Revise movement choices in response to peer feedback and self-reflection to improve a short dance study	Present the final version of personal created music to others that demonstrates craftsmanship and explain connection to expressive intent	Visualize and design technical elements that support the story and given circumstances in a drama/theatre work	When making works of art, utilize and care for materials, tools, and equipment in a manner that prevents danger to oneself and others	Refine and modify media artworks, honing aesthetic quality and intentionally accentuating stylistic elements, to reflect an understanding of personal goals and preferences
Demonstrate locomotor and non-locomotor movements that change body shapes, levels, and facings	Demonstrate understanding of the structure in music selected for performance	Collaborate to determine how characters might move and speak to support the story and given circumstances in drama/theatre work	Design or redesign objects, places, or systems that meet the identified needs of diverse users	Demonstrate how a variety of academic arts, and media forms and content may be mixed and coordinated into media artworks, such as narrative, dance, and media
Replicate body shapes, movement characteristics, and movement patterns in a dance sequence with awareness of body alignment and core support	With limited guidance, apply personal, teacher and peer feedback to refine performances	Develop a scripted or improvised character by articulating the character's inner thoughts, objectives, and motivations in a drama/theatre work	Distinguish between different materials or artistic techniques for preparing artwork for presentations	Exhibit basic creative skills to invent new content and solutions within and through media arts production

# Odyssey of the Mind and Educational Initiatives

## Art Standards

Dance	Music	Theater	Visual Arts	Media Arts
Judge spaces as distance traveled and use space three-dimensionally. Perform movement sequences in and through space with intentionality and focus	Rehearse to refine technical accuracy and expressive qualities and address performance challenges	Collaborate to devise original ideas for a drama/theatre work by asking questions about characters and plots	Analyze multiple ways that images influence specific audiences	Demonstrate how a variety of academic, arts, and media forms and content may be mixed and coordinated into media artworks, such as narrative, dance, and media
Change use of energy and dynamics by modifying movements and applying specific characteristics to heighten the effects of their intent	Perform music for a specific purpose with expression and technical accuracy	Compare ideas with peers and make selections that will enhance and deepen group drama/theatre work	Develop and apply relevant criteria to evaluate a work of art	Demonstrate adaptability using tools and techniques in standard and experimental ways to achieve an assigned purpose in constructing media artworks
Dance with sensibility toward other dancers while executing complex spatial, rhythmic, and dynamic sequences to meet performance goals	Perform appropriately for the audience and purpose	Collaborate with peers to revise, refine, and adapt ideas to fit the given parameters of a drama theatre work	Generate a collection of ideas reflecting current interests and concerns that could be investigated in art making	Evaluate the results of and implement improvements for presenting media artworks, considering impacts on personal growth and external effects
Dance for and with others in a space where audience and performers occupy different areas	Evaluate musical works and performances, applying established criteria, and explain appropriateness to the content	Refine, transform, and re-imagine a devised or scripted drama/theatre work using the rehearsal process to invent or re-imagine style, genre, form, and conventions	Interpret art by analyzing art making approaches, the characteristics of form and structure, relevant contextual information, subject matter, and use of media to identify ideas and mood conveyed	Identify, describe, and analyze how message and meaning are created by components in media artworks
Explore the use of simple props to enhance performance	Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music	Develop physical and vocal exercise techniques for an improvised or scripted drama/theatre work	Identify how art is used to inform or change beliefs, values, or behaviors of an individual or society	Describe, compare, and analyze how various forms, methods, and styles in media artworks interact with personal preferences in influencing audience experience
Demonstrate and describe observed or performed dance movements from a specific genre or culture	Present the final version of created music for others	Create innovative solutions to design and technical problems that arise in rehearsal for a drama/theatre work	Engage in constructive critique with peers, then reflect on, re-engage, revise, and refine works of art and design in response to personal artistic vision	Identify and apply basic criteria for evaluating and improving media artworks and production process, considering context

# Odyssey of the Mind and Educational Initiatives

## Art Standards

Dance	Music	Theater	Visual Arts	Media Arts
Describe, create, and/or perform a dance that expresses personal meaning	Demonstrate understanding of relationships between music and the other arts, other disciplines, varied context, and daily life	Interpret story elements in a guided drama experience	Interpret art by analyzing how the interaction of subject matter, characteristics of form and structure, use of media, art-making approaches, and relevant contextual information contributes to understanding messages or ideas and mood conveyed	Access, evaluate, and use internal and external resources to create media artworks such as knowledge, experiences, interests, and research
Observe illustrations from a story. Discuss observations and identify ideas for dance movement and demonstrate the big ideas of the story	Using digital tools and demonstrate attention to technical accuracy and expressive qualities in prepared and improvised performances of a varied repertoire of music	Use body, face, gestures, and voice to communicate character traits and emotions		Analyze and interact appropriately with media arts tools and environments considering fair use and copyright, ethics, and media literacy
Observe a dance and relate the movement to the people or environment in which the dance was created and performed	Assemble and organize multiple sounds or musical ideas to create initial expressive statements of selected sonic events, memories, images, concepts, texts, or storylines	Choose a variety of technical elements that can be applied to a design in a drama/theatre work		
		Perform a scripted drama/theatre work for a specific audience		
		Identify artistic choices made in a drama/theatre work through participation and observation		
		Recognize and share artistic choices when participating in or observing a drama/theatre work		
		Consider multiple ways to develop a character using physical characteristics and prop or costume design choices that reflect cultural perspectives in drama/theatre work		