

STEM/STEAM

Odyssey of the Mind™



www.odysseyofthemind.com

www.coloradoodyssey.org

PROBLEM 1 (VEHICLE)

Triathlon Travels

On your mark...get set...go! In this problem, teams will make and operate an original vehicle in an Odyssey triathlon. Team members will ride on their unique vehicle as it competes in multiple events during an entertaining presentation. The vehicle will be used to score in “curling,” to hit the right targets when “jousting,” and to “run track” by navigating a course in two directions. During the triathlon the vehicle will change appearance. All of this action will take place in a team-created performance with a commentator and coach that features the vehicle’s travels while entertaining the audience between events.

STEM Initiative

Science	Technology	Engineering	Mathematic
<p>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.</p> <p>Research/understand energy, its sources, and how it applies to different propulsion systems.</p> <p>Research/understand simple machines, transmissions, leverage, mechanics of motion, inertia, friction, braking.</p> <p>Research/understand the construction and materials in the design of vehicles and propulsion systems.</p>	<p>Use technology tools to enhance learning, increase productivity, and promote creativity.</p> <p>Research different methods of control, steering, and propulsion in designing and building the vehicle.</p> <p>Research different sources of energy for vehicle’s propulsion.</p> <p>Use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.</p>	<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>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.</p> <p>Develop an understanding that engineers need to communicate effectively as individuals and as members of a team.</p> <p>Design, test and build systems, components, or processes to meet desired needs within realistic constraints as they relate to vehicles, propulsion systems, obstacles, etc.</p>	<p>Use visualization, spatial reasoning, and geometric modeling to solve problems in the creation of the vehicle and propulsion systems, etc.</p> <p>Utilize estimation, measurement, computational skills, and spatial/geometric relationships in order to:</p> <ol style="list-style-type: none"> a. Work within budgetary, time, and space limitations. b. Analyze scoring criteria to prioritize problem elements such as vehicle and design, and propulsion systems. <p>Solve real-world and mathematical problems involving area, surface area, and volume.</p>

PROBLEM 2 (TECHNICAL)
Emoji, Speak for Yourself

Three-dimensional emojis will be used to communicate the life story of a once famous, but now forgotten, emoji. Teams will create a performance where the emojis demonstrate special functions like growing, turning into a team member, and changing into a different emoji. Performances will also include a choreographed dance, a technical representation of texting, and sounds to enhance the performance. The twist? No spoken language is allowed.

STEM Initiative

Science	Technology	Engineering	Mathematics
<p>Understand the properties of objects and materials, and the changes of properties in matter in order to create devices.</p> <p>Research and develop an understanding of how energy may be used to power devices.</p> <p>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.</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.</p> <p>Employ technology in the development of strategies for solving problems in the real world.</p> <p>Understand and use technology systems.</p> <p>Use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.</p>	<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>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.</p> <p>Develop an understanding that engineers need to communicate effectively as individuals and as members of a team.</p> <p>Design, create and build a solution in which three dimensional emojis can change form and texting can be presented in a technical and creative way.</p>	<p>Use visualization, spatial reasoning, and geometric modeling to solve problems in the creation of devices to complete tasks.</p> <p>Utilize estimation, measurement, computational skills, and spatial relationships in order to:</p> <ol style="list-style-type: none"> a. Work within budgetary, time, and space limitations. b. Explore multiple ways emojis might be able to grow or transform. c. Analyze scoring criteria to prioritize problem elements such as quality and creativity of the performance, creativity of engineering of the emojis and of the texting technical representation.

PROBLEM 3 (CLASSICS)
Classics... Mockumentary! Seriously?

There are often two sides to the same story. In this problem, characters don't always agree as they recount the classic story where they appeared. The team will select a classic from a list and present different characters in a humorous documentary-style performance where details are added, denied, exaggerated, and disputed. There will be interviews, behind-the-scenes "clips," and voice-overs that take the audience through the story and help present the events as they "really" took place. Whose side will you be on?

STEM Initiative

Science	Technology	Engineering	Mathematics
<p>Understand the properties of objects and materials, and the changes of properties in matter in order to create the "mockumentary".</p> <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>Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.</p> <p>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.</p> <p>Develop a diagram or simple physical prototype to convey a proposed object, tool, or process.</p>	<p>Use technology tools to enhance learning, increase productivity, and promote creativity.</p> <p>Use productivity tools to collaborate in constructing creative works.</p> <p>Know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts and solving authentic problems.</p> <p>Communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.</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 engineering as a vehicle for creative and critical thinking and inquiry.</p> <p>Develop an understanding that engineers need to communicate effectively as individuals and as members of a team.</p> <p>Undertake a design project, engaging in the design cycle, to construct and/or implement a solution that meets specific design criteria and constraints.</p>	<p>Use visualization, spatial reasoning, and geometric modeling to solve problems in the creation of a "mockumentary.</p> <p>Utilize estimation, measurement, computational skills, and spatial/geometric relationships in order to:</p> <ul style="list-style-type: none"> (a) Work within budgetary, time, and space limitations. (b) Analyze scoring criteria to prioritize problem elements such as the team-created court, the historic royal court, the team created instrument, etc. <p>Use digital tools and/or mathematical concepts and arguments to test and compare proposed solutions to an engineering design problem.</p>

PROBLEM 4 (STRUCTURE)

Animal House

Over the years, Odyssey of the Mind teams have designed structures that changed into many unbelievable shapes and sizes that balanced and held as much weight as possible. This year, teams will turn their balsa wood structures into animals! Since animals need to eat, they must be fed. The structure will have its appearance transformed and explained during an original performance. During the performance, the structure must hold the team-created food while it supports weights.

STEM Initiative

Science	Technology	Engineering	Mathematics
<p>Understand the properties of objects and materials, and the changes in properties and matter in order to create weight-bearing structures.</p> <p>Research and understand material properties of balsa and various adhesives. Understand effects of various environments on materials.</p> <p>Understand how design of a structure affects weight transfer through the structure and how weight placement impacts the ability to hold weight without collapsing.</p> <p>Evaluate safety issues involved with materials being used in construction of the structure, particularly relating to structural collapse.</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 and produce other creative works.</p> <p>Utilize technology in research and design in all aspects of the solution including the component structures and their integration with the artistic representation of food.</p>	<p>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.</p> <p>Develop an understanding that engineers need to communicate effectively as individuals and as members of a team.</p> <p>Apply contemporary engineering tools and technology to define, analyze, model, and build prototype structures made of multiple, separate components.</p> <p>Evaluate structural characteristics of balsa wood and glued connections. Evaluate connections – surface area of joining pieces, geometry of joints.</p>	<p>Use visualization, spatial reasoning, and geometric modeling to solve problems in the creation a balsa wood structure.</p> <p>Utilize geometry and trigonometry to analyze component structures and how those components will be stacked as the final structure.</p> <p>Utilize estimation, measurement, computational skills, and spatial relationships in order to:</p> <ul style="list-style-type: none"> (a) Work within budgetary, time, and space limitations. (b) Analyze scoring criteria to prioritize problem elements such as weight held, creativity of the performance, etc.

PROBLEM 5 (PERFORMANCE)

A Stellar Hangout

As Odyssey of the Mind teams know, people with very different interests, backgrounds, tastes, and even languages can get along easily once they find a common interest. And what brings people together more than food, entertainment, and treasure? In this problem, teams bring together original creatures in a creative hangout during a quest for treasure. When so many “out of this world” personalities come together it’s sure to bring about fun – and funny – interactions!

STEM Initiative

Science	Technology	Engineering	Mathematics
<p>Understand the abilities of technological design.</p> <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>Use technology tools to enhance learning, increase productivity, and promote creativity.</p> <p>Use productivity tools to collaborate in constructing technology-enhanced models and produce other creative works.</p> <p>Employ technology in the development of strategies for solving problems in the real world, including those related to social situations.</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 engineering as a vehicle for creative and critical thinking and inquiry.</p> <p>Develop an understanding that engineers need to communicate effectively as individuals and as members of a team.</p>	<p>Make decisions about units and scales that are appropriate for problem situations involving measurement in order to design a moving set.</p> <p>Utilize estimation, measurement, computational skills, and spatial relationships in order to:</p> <ul style="list-style-type: none">(a) Work within budgetary, time, and space limitations.(b) Analyze scoring criteria to prioritize problem elements.

PROBLEM 6 (PRIMARY)

We're Cooking Now

Teams will create and present their own cooking show, have Chef and special guest who learns to cook from the Chef, while learning to build using balsa wood. Watch what happens when creativity is mixed with teamwork to make a deliciously entertaining solution.

STEM Initiative

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>Ask questions to obtain information about the cooking and balsa wood construction.</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>Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.</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 backdrops and produce other creative works.</p> <p>Employ technology in the development of strategies for solving problems in the real world.</p> <p>Understand and use technology systems.</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 engineering as a vehicle for creative and critical thinking and inquiry.</p> <p>Develop an understanding that engineers need to communicate effectively as individuals and as members of a team.</p> <p>Recognize design is a creative process and everyone can design solutions to problems.</p>	<p>Use visualization, spatial reasoning, and geometric modeling to solve problems in the creation of a backdrop, the balsa wood structures, and kitchen setting.</p> <p>Utilize estimation, measurement, computational skills, and spatial relationships in order to:</p> <ol style="list-style-type: none">Work within budgetary, time, and space limitations.Analyze scoring criteria to prioritize problem elements such as artistic quality of the backdrop, creativity of the types of "wacky weather" forecasted, effectiveness of the meteorologist character, etc.

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. 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 (ex., use materials to build/design/change an item), to verbal problems (ex., name types of trees).

STEM Initiative

Science	Technology	Engineering	Mathematics
<p>Use innovation to solve problems.</p> <p>Apply an intuitive understanding of gravity, motion, force and other physics concepts.</p> <p>Apply an understanding of the composition, properties, and creative use of materials. (ex., what can we use to support the structure, what can we use to make it taller, etc.)</p> <p>Test alternate hypotheses. (ex., what is another way to build this?)</p> <p>Evaluate results.</p>	<p>Utilize innovation in the creative use of everyday objects (ex., toothpicks, clay, and paper plates) as tools and materials to solve problems.</p> <p>Implement nontraditional communication methods (gestures, tapping on table) to brainstorm and solve problems.</p>	<p>Apply knowledge of science, technology, engineering, and mathematics to define, analyze, and solve problems</p> <p>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.</p> <p>Develop an understanding that engineers need to communicate effectively as individuals and as members of a team.</p>	<p>Utilize estimation, measurement, computational skills, and spatial relationships in order to:</p> <p style="padding-left: 20px;">a. Work within time and space limitations outlined in the problem.</p> <p>Analyze scoring criteria (what is worth the most points) to prioritize problem elements (what should we do first to get a higher score?)</p>

ODYSSEY OF THE MIND AND EDUCATIONAL INITIATIVES ART STANDARDS

DANCE	MUSIC	THEATRE	VISUAL ARTS	MEDIA ARTS
<ul style="list-style-type: none"> • Identify ideas for choreography generated from a variety of stimuli • Construct and solve multiple movement problems to develop choreographic content • Improve a series of movements that have a beginning, middle, and end • Revise movement choices in response to peer feedback and self-reflection to improve a short dance study • Demonstrate locomotor and non-locomotor movements that change body shapes, levels, and facings • Replicate body shapes, movement characteristics, and movement patterns in a dance sequence with awareness of body alignment and core support • Judge spaces as distance traveled and use space three-dimensionally. Perform movement sequences in and through space with intentionality and focus • Change use of energy and dynamics by modifying movements and applying specific characteristics to heighten the effects of their intent • Dance with sensibility toward other dancers while executing complex spatial, rhythmic and 	<ul style="list-style-type: none"> • Generate a simple rhythmic, melodic, and harmonic phrases within AB and ABA forms that convey expressive intent • Generate musical ideas (rhythms, melodies, and accompaniment patterns) • Demonstrate selected and organized musical ideas for an improvisation, arrangement, or composition to express intent and explain connection to purpose and context • Present the final version of personal created music to others that demonstrates craftsmanship and explain connection to expressive intent • Demonstrate understanding of the structure in music selected for performance • With limited guidance, apply personal, teacher and peer feedback to refine performances • Rehearse to refine technical accuracy and expressive qualities and address performance challenges • Perform music for a specific purpose with expression and technical accuracy • Perform appropriately for the audience and purpose • Evaluate musical works and performances, applying established criteria, and 	<ul style="list-style-type: none"> • With prompting, and support, invent and inhabit an imaginary elsewhere in dramatic play or guided drama experience • Investigate multiple perspectives and solutions to staging challenges in a drama/theatre work • Collaborate with peers to conceptualize scenery in a guided drama experience • Visualize and design technical elements that support the story and given circumstances in a drama/theatre work • Collaborate to determine how characters might move and speak to support the story and given circumstances in drama/theatre work • Develop a scripted or improvised character by articulating the character's inner thoughts, objectives, and motivations in a drama/theatre work • Collaborate to devise original ideas for a drama/theatre work by asking questions about characters and plots • Compare ideas with peers and make selections that will enhance and deepen group drama/theatre work • Collaborate with peers to revise, refine, and adapt ideas to fit the given parameters of a drama theatre work 	<ul style="list-style-type: none"> • Demonstrate willingness to experiment, innovate, and take risks to pursue ideas, forms, and meaning that emerge in the process of art-making or designing • Brainstorm multiple approaches to a creative art or design problem • Collaboratively set goals and create artwork that is meaningful and has purpose to the makers • When making works of art, utilize and care for materials, tools, and equipment in a manner that prevents danger to oneself and others • Design or redesign objects, places, or systems that meet the identified needs of diverse users • Distinguish between different materials or artistic techniques for preparing artwork for presentations • Analyze multiple ways that images influence specific audiences • Develop and apply relevant criteria to evaluate a work of art • Generate a collection of ideas reflecting current interests and concerns that could be investigated in art making • Interpret art by analyzing artmaking approaches, the characteristics of form and structure, relevant contextual 	<ul style="list-style-type: none"> • Formulate variations of goals and solutions for media artworks by practicing chosen creative processes, such as sketching, improvising, and brainstorming • Organize, propose, and evaluate artistic ideas, plans, prototypes, and production processes for media arts productions, considering purposeful intent • 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 • Refine and modify media artworks, honing aesthetic quality and intentionally accentuating stylistic elements, to reflect an understanding of personal goals and preferences • 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 • Exhibit basic creative skills to invent new content and solutions within and through media arts production • Demonstrate how a variety of academic, arts, and media

<p>dynamic sequences to meet performance goals</p> <ul style="list-style-type: none"> • Dance for and with others in a space where audience and performers occupy different areas • Explore the use of simple props to enhance performance • Demonstrate and describe observed or performed dance movements from a specific genre or culture • Describe, create, and/or perform a dance that expresses personal meaning • Observe illustrations from a story. Discuss observations and identify ideas for dance movement and demonstrate the big ideas of the story • Observe a dance and relate the movement to the people or environment in which the dance was created and performed 	<p>explain appropriateness to the content</p> <ul style="list-style-type: none"> • Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music • Present the final version of created music for others • Demonstrate understanding of relationships between music and the other arts, other disciplines, varied context, and daily life • Using digital tools and demonstrate attention to technical accuracy and expressive qualities in prepared and improvised performances of a varied repertoire of music • Assemble and organize multiple sounds or musical ideas to create initial expressive statements of selected sonic events, memories, images, concepts, texts, or storylines 	<ul style="list-style-type: none"> • 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 • Develop physical and vocal exercise techniques for an improvised or scripted drama/theatre work • Create innovative solutions to design and technical problems that arise in rehearsal for a drama/theatre work • Interpret story elements in a guided drama experience • Use body, face, gestures, and voice to communicate character traits and emotions • 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 	<p>information, subject matter, and use of media to identify ideas and mood conveyed -</p> <ul style="list-style-type: none"> • Identify how art is used to inform or change beliefs, values, or behaviors of an individual or society • 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 • 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 	<p>forms and content may be mixed and coordinated into media artworks, such as narrative, dance, and media</p> <ul style="list-style-type: none"> • Demonstrate adaptability using tools and techniques in standard and experimental ways to achieve an assigned purpose in constructing media artworks • Evaluate the results of and implement improvements for presenting media artworks, considering impacts on personal growth and external effects • Identify, describe, and analyze how message and meaning are created by components in media artworks • Describe, compare, and analyze how various forms, methods, and styles in media artworks interact with personal preferences in influencing audience experience • Identify and apply basic criteria for evaluating and improving media artworks and production process, considering context • Access, evaluate, and use internal and external resources to create media artworks such as knowledge, experiences, interests, and research • Analyze and interact appropriately with media arts tools and environments considering fair use and copyright, ethics, and media literacy
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