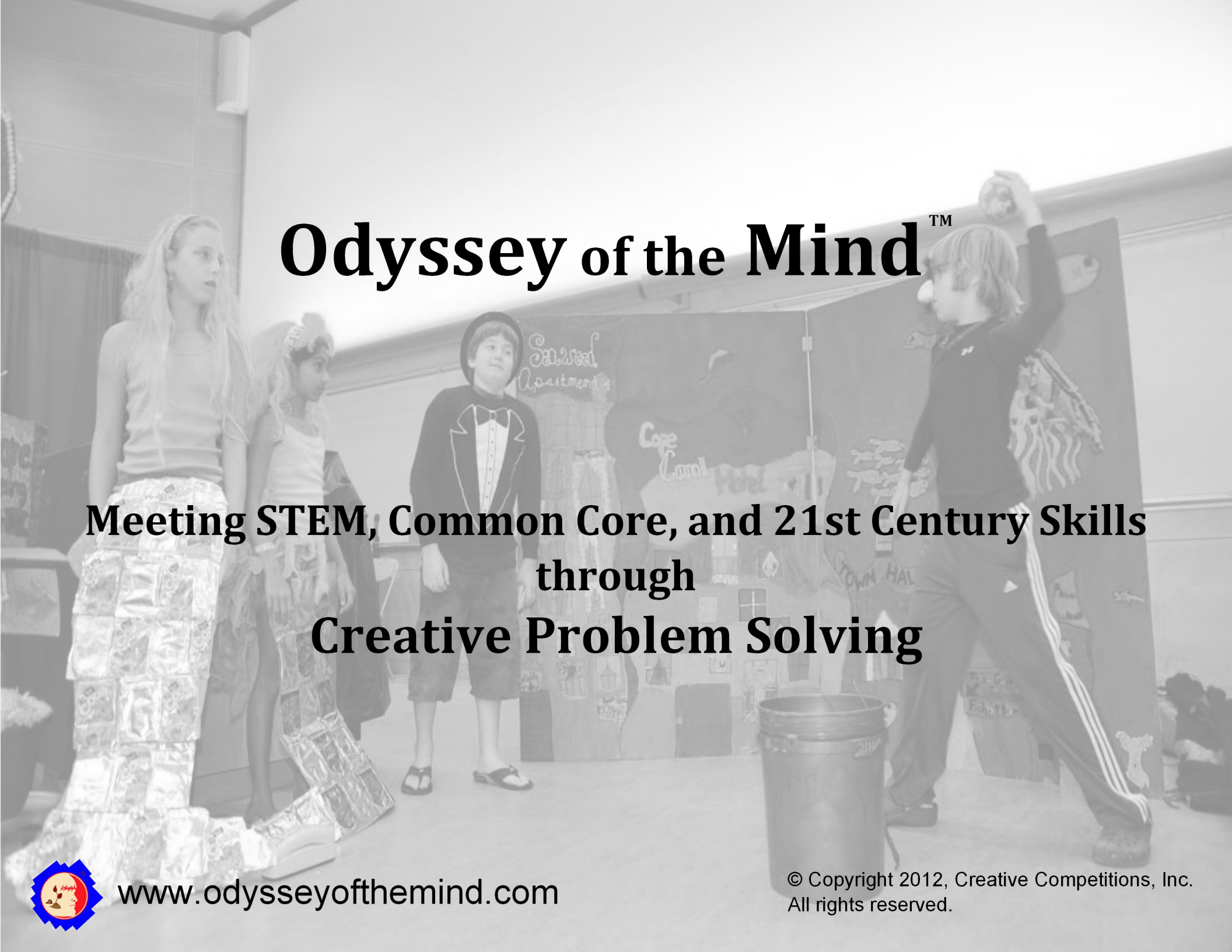

Odyssey of the Mind™

Meeting STEM, Common Core, and 21st Century Skills through Creative Problem Solving

www.odysseyofthemind.com

Odyssey of the Mind and Educational Initiatives

PROBLEM 1 (VEHICLE)

Pet Project

The problem is to design, build, and run three vehicles that will deliver parts to an Assembly Area. The team will create a signal that lets the audience know which vehicle is about to travel and deliver a part. The parts will be assembled into a pet animal. Once assembly is completed, the animal will perform a trick. The theme of the presentation must include the delivery of the parts, the assembly, and the pet animal.

STEM Initiative

Science	Technology	Engineering	Mathematics
Research/understand energy, its sources, and how it applies to different propulsion systems. Understand simple machines, leverage, mechanics of motion, inertia, friction, braking. Understand zoology and paleontology in order to assemble a pet that resembles an existing or extinct animal.	Research different methods of remote control, steering, and braking in designing and building the vehicles. Understand different methods of assembly of the pet animal. Understand methods of communication to indicate sequence of vehicle travel.	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. Apply contemporary engineering tools in the application of science, mathematics and technology to define analyze, model and build prototype solutions to problems. Design, build and operate three vehicles with different propulsion systems to deliver parts for assembly. Assembled parts (pet animal) will perform or be part a trick. Develop an understanding that engineers need to communicate effectively as individuals and as members of a team.	Utilize estimation, measurement, computational skills, and spatial relationships in order to: (a) Work within budgetary, time, and space limitations. (b) Analyze scoring criteria to prioritize problem elements such as vehicles' design, propulsion systems, pet animal, etc.

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PROBLEM 2 (TECHNICAL)

The Email Must Go Through

The team's problem is to create and present an original performance that includes a technical representation of messages being sent by email. A Sender character will send three emails: one that requires a return receipt, one with a work of art as an attachment, and one that goes through a SPAM filter. Two of the emails will go to a Receiver character and another will go to an offbeat location. Each email will pass through a central server before reaching its final destination. Team members are not allowed to touch the emails while the server is processing the messages.

STEM Initiative

Science	Technology	Engineering	Mathematics
Research and develop an understanding of energy that may be needed to operate the delivery system. Develop an understanding of simple machines, leverage, mechanics of motion, inertia, and friction.	Use technology to enhance learning, increase productivity, and promote creativity. Use productivity tools to collaborate in constructing technology-enhanced models that simulate the "email" delivery system and to produce other creative works.	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. Apply contemporary engineering tools in the application of science, mathematics and technology to define, analyze, model and build prototype solutions to problems. Design, build and operate a system to sort and deliver email representations. Develop an understanding that engineers need to communicate effectively as individuals and as members of a team.	Utilize estimation, measurement, computational skills, and spatial relationships in order to: (a) Work within budgetary, time, and space limitations. (b) Analyze scoring criteria to prioritize problem elements such as creativity of the performance of the server and filter, successful transportation of "emails," the work of art, etc.

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PROBLEM 3 (CLASSICS)
ARTchitecture: The Musical

For this problem, teams will create and present an original performance that includes a replica of a documented architectural structure that was built between 1,000 AD and 1,600 AD. The performance will include three works of art that "disappear" and two characters that go on a quest to find them. When the works of art are found, they will be incorporated into the replica. The performance must also include two songs that are accompanied by some type of choreographed movement.

STEM Initiative

Science	Technology	Engineering	Mathematics
Understand the properties of objects and materials, and the changes of properties in matter in order to create the illusion of objects appearing and disappearing. Understand the position and motion of objects in order to create the illusion of objects appearing and disappearing.	Use technology tools to enhance learning, increase productivity, and promote creativity. Use productivity tools to collaborate in constructing a technology-enhanced model of an architectural replica and produce other creative works.	Design, test, and build a system, component, or process to meet desired needs within realistic constraints. Apply the engineering design process, troubleshooting, research and development, invention and innovation, and experimentation in problem solving and engineering design. Develop an understanding that engineers need to communicate effectively as individuals and as members of a team.	Use visualization, spatial reasoning, and geometric modeling to solve problems in the creation of an architectural replica. Utilize estimation, measurement, computational skills, and spatial relationships in order to: (a) Work within budgetary, time, and space limitations. (b) Analyze scoring criteria to prioritize problem elements.

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PROBLEM 4 (STRUCTURE)
Tumble-wood

Teams will design and build a structure made of only balsa wood and glue that will balance and support as much weight as possible. Before weight placement begins, the team will present a commercial that includes the structure rolling down a ramp. The structure will be scored for how far it rolls and for how much weight it holds. The team will integrate the placement of the weights into the performance.

STEM Initiative

Science	Technology	Engineering	Mathematics
Research and understand material properties of balsa and various adhesives. Understand effects of various environments on materials. Understand how design of structure affects weight transfer,how weight placement impacts performance. Evaluate safety issues involved with materials being used in construction of the structure, set, ramp, particularly relating to structural collapse. Understand the laws of motion in relation to transporting the structure safely.	Apply the process of design. Utilize technology in research and design in all aspects of the solution, including the transport mechanism or method, the structure and props/scenery. Observe how design of the structure affects weight transfer; how weight placement impacts performance.	Apply a structured approach to solving problems; define problem, brainstorm ideas, research, identify criteria, explore the possibilities, make a model, evaluate, communicate results, revise to improve performance. Apply contemporary engineering tools and technology to define, analyze, model, and build prototype structures and ramps. Evaluate structural characteristics of materials (balsa wood/glue) and connections. Evaluate material/chemical (glue) connections – surface area of joining pieces, geometry of joints. Develop an understanding that engineers need to communicate effectively as individuals and as members of a team.	Utilize geometry and trigonometry to analyze structure (e.g., truss) and ramp. Utilize estimation, measurement, computational skills, and spatial relationships in order to: (a) Work within budgetary, time, and space limitations. (b) Analyze scoring criteria to prioritize problem elements such as structure, ramp, creativity of commercial, performance, etc.

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PROBLEM 5 (PERFORMANCE)
It's How You Look At It

The problem is to create and present an original humorous performance that includes two characters that act naturally -- to them -- but odd to those around them. One scene will establish the "normal" behavior of one character that, at some point in the performance, finds itself among others who react to the out-of-place behavior. The other character's behavior will stand out too, but this character will end up in a setting where its odd behavior is considered normal. The performance will also include a meter that indicates the degree of odd/normal behavior and a creative scene change.

STEM Initiative

Science	Technology	Engineering	Mathematics
Understand the abilities of technological design in order to create a behavioral meter. Understand and apply characteristics and changes in populations in order to show a measure of degrees of behavioral normality.	Use technology tools to enhance learning, increase productivity, and promote creativity. Use productivity tools to collaborate in constructing technology-enhanced models and produce other creative works. Employ technology in the development of strategies for solving problems in the real world, including those related to social situations.	Design, test, and build a system, component, or process to meet desired needs within realistic constraints. Apply the engineering design process, troubleshooting, research and development, invention and innovation, and experimentation in problem solving and engineering design. Use engineering as a vehicle for creative and critical thinking and inquiry. Develop an understanding that engineers need to communicate effectively as individuals and as members of a team.	Make decisions about units and scales that are appropriate for problem situations involving measurement in order to develop an original meter. Select and use benchmarks to estimate measurements. Utilize estimation, measurement, computational skills in order to: (a) Work within budgetary, time, and space limitations. (b) Analyze scoring criteria to prioritize problem elements.

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PRIMARY
Top Sea-cret Discoveries

The problem is to create and present a performance that includes exploring the ocean and making discoveries. Along the way, they will encounter three different types of sea life and a humorous Captain character. Teams will also create an original reason for the ocean's waves and make a silly discovery that they have to help keep secret.

STEM Initiative

Science	Technology	Engineering	Mathematics
Understand Oceanography in order to develop a team created reason for the ocean's waves. Develop an understanding of Marine Biology in order to include three different types of sea life in the solution.	Use technology to enhance learning, increase productivity, and promote creativity. Use productivity tools to collaborate in constructing technology-enhanced models of the three types of sea life.	Design, test, and build a system, component, or process to meet desired needs within realistic constraints. Apply the engineering design process, troubleshooting, research and development, invention and innovation, and experimentation in problem solving and engineering design. Develop an understanding that engineers need to communicate effectively as individuals and as members of a team.	Utilize estimation, measurement, computational skills, and spatial relationships in order to: (a) Work within budgetary, time, and space limitations. (b) Analyze scoring criteria to prioritize problem elements such as creativity of performance, types of sea life, etc.

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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
Use innovation to solve problems. Apply an intuitive understanding of gravity, motion, force and other physics concepts. 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.) Test alternate hypotheses. (ex., what is another way to build this?) Evaluate results.	Utilize innovation in the creative use of everyday objects (ex., toothpicks, clay, paper plates) as tools and materials to solve problems. Implement nontraditional communication methods (gestures, tapping on table) to brainstorm and solve problems.	Apply knowledge of science, technology, engineering, and mathematics to define, analyze, 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. Develop an understanding that engineers need to communicate effectively as individuals and as members of a team.	Utilize estimation, measurement, computational skills, and spatial relationships in order to: (a) Work within time and space limitations outlined in the problem. (b) Analyze scoring criteria (what is worth the most points) to prioritize problem elements (what should we do first to get a higher score?)

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COMMON CORE

Common Core is:

- Aligned with college and work expectations.
- Includes rigorous content and application of knowledge through higher-order skills.
- Built upon strengths and lessons of current state standards.
- Informed by top-performing countries, so that all students are prepared to succeed in our global economy.
- Evidence and/or research-based.

English/Language Arts	Odyssey Teams
Key Ideas and Details	All problems require team members to read closely to determine what the text says explicitly and to make logical inferences from it. Cite specific textual evidence when writing or speaking to support conclusions drawn from the text. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.
Craft and Structure	Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words. Analyze the structure of texts. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
Integrations of Knowledge and Ideas	Team members analyze how two or more texts address similar themes or topics in order to build knowledge. Delineate and evaluate the argument and specific claims in a text. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.
Range of Reading and Level of Text Complexity	Each problem requires students to read and comprehend complex literary and informational texts independently and proficiently in order to solve the problems.

Odyssey of the Mind and Educational Initiatives

Math	Odyssey Teams
Make sense of problems and persevere in solving them	Team members start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt.
Reason abstractly and quantitatively	Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; consider the unit/parts involved; attend to the meaning
Construct viable arguments and critique the reasoning of others	The student must understand and use stated assumptions, definitions, and previously established results in constructing arguments.
Model with mathematics	Utilizing problems arising in everyday life, society, and the workplace, students model mathematics in many phases of the problems.
Use appropriate tools strategically	These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations solving the problem they choose.
Attend to precision	Students, as team members, try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context.

Odyssey of the Mind and Educational Initiatives

Math Cont'd	Odyssey Teams
Look for and make use of structure	Students look closely to discern a pattern or structure within a given problem. They also can step back for an overview and shift perspective. They can see complicated things as single objects or as being composed of several objects.
Look for and express regularity in repeated reasoning	Students notice if calculations are repeated, and look both for general methods and for shortcuts.

Writing Standards For Literacy in History/Social Studies, Science, and Technical Subjects	Odyssey Teams
Write arguments focused on a discipline-specific content	Many teams write a script to address the specifics of their solution.
Produce clear and coherent writing appropriate to task, purpose, and audience	Teams are encouraged to focus their script and their performance on a specific task, purpose, and audience.
Conduct short as well as sustained research projects to answer a question.	Many aspects of Odyssey of the Mind require teams to conduct research to answer specific questions.
Gather relevant information from multiple sources.	Odyssey teams gather material from multiple sources.

Odyssey of the Mind and Educational Initiatives

Reading Standards for Literacy in Science and Technical Subjects (RST)	Odyssey Teams
Follow precisely a multistep procedure when carrying out experiments or performing technical tasks	Teams follow many multistep procedures as they test and retest possible solutions.
Translate quantitative or technical information expressed in words in a text into a visual form	Odyssey teams take quantitative and technical information and transform it into a creative visual expression.
Compare and contrast findings presented, noting when findings support or contradict previous explanations	Students work as a team to compare and contrast findings as they develop their solutions.
Integrate and evaluate multiple sources of information presented in diverse formats and media	Students use multiple sources of information including a diversity of formats and media in their quest for solutions.
Evaluate the hypothesis, data, analysis, and conclusions found in science, verifying the data when possible and corroborating or challenging conclusions	Students naturally use the scientific method as they work through their long term solutions.
Synthesize information from a range of sources into a coherent understanding	The synthesis of information from a range of sources comes together in a coherent presentation of the team's solution.

Odyssey of the Mind and Educational Initiatives

Reading Standards for Literacy in History/Social Studies (RH)	Odyssey Teams
Determine the central ideas or information of a primary or secondary source	Team members work together to analyze both primary and secondary sources as they work with the problem and access resources as they search for a solution.
Determine the meaning of words and phrases as they are used in a text	The meaning of words and phrases in the Odyssey of the Mind problems has an impact on each solution.
Integrate visual information	Visual information can become an integral part of an Odyssey solution.
Distinguish among fact, opinion, and reasoned judgment	As teams search for a solution, the ability to distinguish between fact, opinion, and reasoned judgment can be critical.
Integrate and evaluate multiple sources of information presented in diverse formats and media in order to address a question or solve a problem.	Teams integrate information from a wide variety of sources into their solutions.

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Next Generation Science Standards May 2012 Draft Science and Engineering Practices	Odyssey Teams
Analyzing and Interpreting Data	Throughout the problem solving process teams continuously review, analyze, and interpret data as they develop their solutions building on past experiences and knowledge and seeking new information.
Asking Questions and Defining Problems	Questioning and defining problems is an integral part of the problem solving process.
Constructing Explanations and Defining Problems	Odyssey teams collaborate to define problems and construct and often reconstruct explanations supported by multiple sources of evidence consistent with scientific knowledge, principles, and theories.
Developing and Using Models	Students develop, design, and use models to predict, explain, or collect data to test ideas and develop solutions.
Engaging in Argument from Evidence	Using both oral and written arguments, teams use empirical evidence and data to design and support their solutions.
Obtaining, Evaluating, and Communicating Information	Odyssey teams generate, synthesis, communicate, and critique methods and designs as they seek solutions.
Planning and Carrying out Investigations	Students plan and carry out investigations that use multiple variables and provide evidence to support solutions.
Using Mathematics and Computational Thinking	Teams use mathematical and computational thinking to support solutions.

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21st CENTURY SKILLS

21st Century Skills	Odyssey Teams
Global Awareness	Global competitiveness and understanding. Teams meet other teams from around the world at 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 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. 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 solutions.