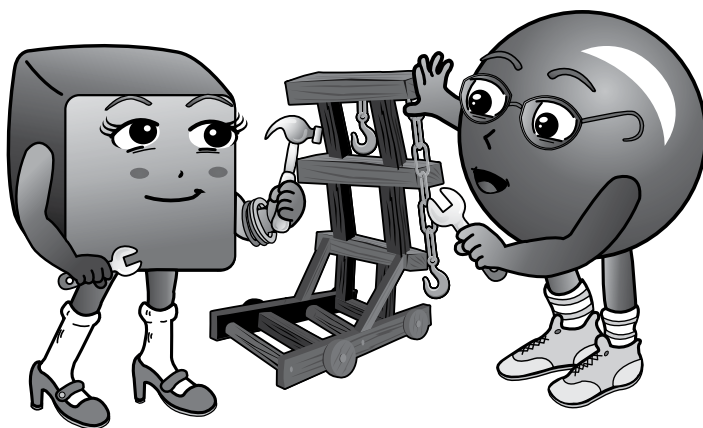


Challenge A

Operation Cooperation

The Destination: Where This Challenge Will Take You!

People use machines to help them every day. But can you imagine machines helping other machines – working together to get the job done? Your team will make Operation Cooperation a reality when you create two machines that cooperate to help each other. Work will be twice as easy, and play will be twice as much fun!



Operation Cooperation
Destination Imagination®

Focus:

Technical Design and Construction, Innovation and Design Process, Research, Experimentation, Strategic Planning, Theater Arts, Teamwork

Points of Interest!

Your team will:

- Design and construct two **Machines** that travel and complete **Tasks**.
- Choose up to 12 **Tasks** for the Machines to complete cooperatively.
- Use **NO plug-in AC** power for any portion of your team's Presentation.
- Create and present a **Story** about cooperation that is set in part in a **Nation** other than your own.
- Create two **Side Trips** and integrate them into the Presentation.

Time Limit:

The team must complete the Presentation (including set up) in eight minutes.

Team Budget:

The total value of the materials used may not exceed \$175 US.

Roadmap for Success:

This Challenge can be solved on many levels, with solutions ranging from very simple to very complex. In order to successfully solve this Challenge, teams must read and follow:

Team Challenge

- A. Itinerary: *The Central Challenge* (240 points)
- B. Itinerary: *Side Trips* (60 points)
- C. Presentation Site
- D. Reward Points

Rules of the Road

Published Clarifications

 (online at www.IDODI.org)

The information in these materials is binding on all teams. **"If it doesn't say you can't, then you can!"**

Team Managers are strongly encouraged to read and use:

- Team Manager Guide*
- Charting Your Course*
- Instant Challenge Practice Set*
- TravelGuide for Teams* (available online after Jan 1, 2009)

Membership

Teams and individuals using these Program Materials must hold a 2008-09 membership. The Destination ImagiNation membership is a license to compete in sanctioned Tournaments and/or to use the Program Materials for educational purposes within your team, school, group, or organization. Online access to Program Materials for registered memberships is on www.IDODI.org.

- My 2008-09 membership number is:

_____ - _____

- My team is planning to compete in a sanctioned Tournament.

I have registered for that Tournament with the:

- Regional or Affiliate Director

A. Itinerary:

The Central Challenge (240 points)

1. **The Intent of the Challenge:** To solve this Challenge, the team must design and build two Machines (A.2) that work together to complete Tasks (A.3). Teams will earn points for:
 - a. Technical Innovation and Design and Construction of each Machine.
 - b. Technical Innovation of the Task attempts.
 - c. The number of Tasks completed while one Machine is Manned and one Machine is Unmanned. Example Tasks are Tie a Knot, Tow and Stack (see Table 1 and Table 2)
 - d. Presenting the theme of cooperation in a team-created Story that is set in all or in part in a Nation other than the team's own.
2. **Machines:** The team will Design and Construct two Machines that can travel and complete Tasks.
 - a. A Machine is any device that transmits or modifies energy to perform or assist in the Task attempts. Machines can be, but are not limited to, electrical, mechanical or pneumatic devices.
 - b. The team must design and construct Machines using their own ideas and skills. Machines that have been created in their *entirety* by the team or parts obtained from kits and assembled in novel ways will score higher for Design and Construction and **Technical Innovation** in D.1. A minimally modified Machine or parts obtained from one or more kits and assembled as intended by the creators of the kit(s) will receive minimal scores for D.1. Machines with more highly integrated and complex components will receive higher scores than simple Machines or Machines whose various parts do not work well together. Teams should be prepared to explain to the Appraisers the ideas and skills they used in the design and construction of the Machines. An unmodified Machine will earn no points for Design and Construction, Technical Innovation or Task completion. (D.1.a and/or D.1.b, and D.2.a and D.2.b). Purchased items with purely decorative changes will be considered unmodified.
 - c. **Machines created by Middle Level (ML), Secondary Level (SL) and University Level (UL) teams must have a Technical Energy Source(s) that is their only source of power for travel and Task completion. Machines created by Elementary Level (EL) teams may be powered by a Technical Energy Source(s) and/or team members.**
 - d. **During their Presentation teams are not permitted to plug anything into an AC outlet.** Although teams are allowed to use DC batteries, teams are not permitted to use any devices that enable a battery or batteries to power an object that would normally plug into an AC outlet. This means DC-AC inverters are not allowed.
 - e. One Machine must be Manned during each Task attempt, except for the Lift Task (Table 2). For the purpose of this Challenge, Manned means that one or more team members must be carried by the Machine. The Machine must bear the full, physical weight of the team member(s). No part of ML, SL and UL team member(s) in or on the Machine may touch the floor. Tasks will be considered to be completed with minor incidents of costumes dragging on the floor.
 - f. One Machine must be Unmanned during each Task attempt. For the purpose of this Challenge, Unmanned means that the Machine must operate without any **Direct Physical Contact** with a team member.
 - g. If a Machine breaks down or needs repairs the Machine must be returned to **Zone A** or **Zone B** by any method before repairs can be made. (See Figure 1)



Special Definitions

Technical Innovation:

This term is best defined by breaking the term down into its parts. Technical refers to the use of principles from scientific fields such as chemistry, computer science, electricity, hydraulics, mathematics, mechanical engineering, physics or structural engineering. (Other technical fields are also acceptable.) Innovation is a new, unique or creative way to solve a problem, accomplish a Task, or combine components. Scores for Technical Innovation will be based on ALL of the team created components of the Machines.

Technical Energy Source:

An energy source is technical when the energy source powering the Machine is NOT a team member. Team members may store energy in the Technical Energy Source (for example, pump fluid into a tank or wind a spring); however, the energy used to power the Machine must come from an energy source other than a team member.

Direct Physical Contact:

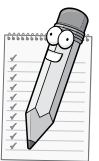
Direct Physical Contact is the use of body parts such as hands, legs or arms to directly interact with the Machines. Instead, the team needs to use some sort of device to touch the Machines. The device may be very simple. A piece of material that simply covers a body part does not qualify as a device.



Special Definitions

Zone (A or B):

For the purposes of this Challenge Machines will be considered to be in a Zone when all floor contact points of the Machine are inside or on the taped boundary of a Zone. A Machine will be considered completely outside of a Zone when all floor contact points are outside the taped boundary of the Zone (Figure 1). Floor contact points are those locations where a Machine touches the floor when the Machine is not moving. Team members cannot be floor contacts.



Challenge Checklist

- One Manned Machine
- One Unmanned Machine
- Machines cooperatively complete Tasks
- Tasks attempted one at a time
- No Direct Physical Contact during Task attempt

- h. The two Machines should be visibly different in appearance or clearly labeled. This will assist the Appraisers in identifying Machine roles during Tasks.
 - i. One Machine has the opportunity to earn more points than the other. On the *Tournament Data Form* the team will indicate which Machine is to be appraised for the higher values for Technical Innovation of propulsion and movement and Design and Construction (D.1.a) and which Machine is to be appraised for the lower values for Technical Innovation and Design and Construction (D.1.b).
3. **Tasks:** The Manned and Unmanned Machines will work together to cooperatively complete Tasks. (Table 1 and Table 2) It is the intent of this Challenge that Machine travel, movement and interaction will accomplish the steps necessary to complete the selected Tasks. The team will earn points for the Technical Innovation of the Task attempts. (D.1.c)
- a. The team may select any or all of two types of Tasks from Table 1 and Table 2.
 - i. Single Tasks (Table 1) may be completed only **one time**.
 - ii. Double Tasks (Table 2) may be completed **two times**. After the first time each Double Task is completed, the first and second Machines must switch roles to complete the Task a second time.
 - b. Team members may not use Direct Physical Contact to complete Tasks.
 - c. All items needed to complete Tasks must be a part of the Machines when the Tasks are being attempted. Items can be added to or removed from Machines only when the Machines are located in **Zone A** or **Zone B** (Figure 1).
 - d. Only one Task may be attempted at a time. Tasks may be attempted in any order. Uncompleted Tasks may be attempted multiple times. Before an attempt, all objects needed for Task completion must be returned to their original position by any method.
 - e. The attempt of any Task must start with one Machine in Zone A and the other Machine in Zone B. Except for the Release and Catch Task, during each attempt at least one Machine must travel completely outside the Zone it started from.
 - f. When a Task attempt is not in progress Machines and objects can be moved by any method.
 - g. If one of the following conditions occurs, the team will not receive a score for the completion of that Task attempt
 - i. A ML, SL or UL team member[s] on the Manned Machine touches the floor when the Machine is not in Zone A or in Zone B (A.2.e).
 - ii. Team members are in Direct Physical Contact with the Unmanned Machine when the Machine is not in Zone A or Zone B (A.2.f).
 - iii. A Machine breaks down or needs repairs (A.2.g). However, incidents of Machine decoration falling off or dragging on the floor will not require another attempt.
 - iv. Team members use Direct Physical Contact during the Task attempt (A.3.b).
 - v. A Machine does not meet the Zone requirements (A.3.e).
 - h. **It is the team's responsibility to initiate Tasks and to determine, according to the Challenge text, whether Tasks have been completed. The Appraisal Team will make no indication of Task completion or incompleteness during the course of the team's Presentation.**

Table 1

Single Task	Intent of the Task
Tie a Knot	Both Machines must work together using a team-provided rope or cord to create a knot. The resulting knot must be pulled tight enough to remain intact until the Presentation is over, so that the knot can be examined by the Appraisers.
Synchronization	Both Machines must perform the same team-defined action or activity at approximately the same time. This action or activity must involve more than straight-line movement of both Machines.
Travel	Both Machines must travel from their original Zone, passing through Home (Figure 1) during their travels, and end in the other Zone. At least one contact point of each Machine must be in Home at the same time.
Stacking	Both Machines must stack team-provided objects in a single, vertical stack. The stack of objects must only touch the floor in Home. All objects to be stacked must originate in Zone A or Zone B. Each Zone must have at least one object. Machines can transport only one object at a time. Machines must alternate, stacking every other object. A stack is defined as at least 3 objects. Objects stacked more than 3 high will qualify for bonus points – up to a maximum of 7 scored objects.



Special Definitions

Home:
For purposes of this Challenge, Home is the 2ft. x 2ft. (.6m x .6m) square area enclosed by the taped boundary, including the tape (Figure 1).

Table 2

Double Task	Intent of the Task
Release and Catch	The first Machine MUST remain in its Zone during this entire Task. The first Machine starts a team-provided object in motion from either Zone A or Zone B. The released object and the second Machine cannot assist the object’s movement across the site. The released object must be in the other Zone when it is retained or caught by the Second Machine. The second Machine must then return the object back to the Zone where the first Machine is located.
Tow	The first Machine must tow the second Machine from one Zone to the other Zone. The Machine being towed must not use its power source to assist with the progress of the Machines across the site.
Lift	The first Machine must lift the second Machine so that all contact points are off the floor for a minimum of 3 seconds. If the Manned Machine is the one being lifted, team member(s) MAY NOT remain on the Machine during the lift. Appraisers will not allow the lift to be performed if team member(s) remain on the Machine. This is the only time the Manned Machine’s team member(s) may touch the floor outside a Zone without having to attempt the Task again.
Delivery & Pick-up	The first Machine transports a team-provided object from Zone A or Zone B to Home. At least part of the item must be touching the floor in Home. The second Machine picks the object up off the floor and transports it to the Zone the object DID NOT start from.



Special Definitions

Nation:

Any real country that is clearly identified on a current or past geopolitical map. The country in which the team is registered for Destination ImagiNation determines the team's own Nation.

4. The team will present an original, International Story about cooperation. All or part of the Story must be set a **Nation** other than the team's own. The Story may be set in any time period and there are no restrictions on characters. Teams will earn points for:
 - a. How well the Story presents the required theme of cooperation.
 - b. The effective representation of the Nation other than the team's own. If multiple Nations are included in the Story, the team must select only one to receive score.
 - c. How the team's Story integrates the Tasks.
 - d. The originality and overall effect of the team's Story.
5. **Team Identification Sign:** The team should provide a free-standing Identification Sign (ID Sign) of approximately 2ft. x 3ft. (0.6m x 0.9m) displaying your team's Team Name, Team Number, School/Organization (if different from Team Name), and Level. It cannot be used as a scoring element. See "Team Identification Sign" section in *Rules of the Road* for further information.

B. Itinerary: Side Trips (60 points)

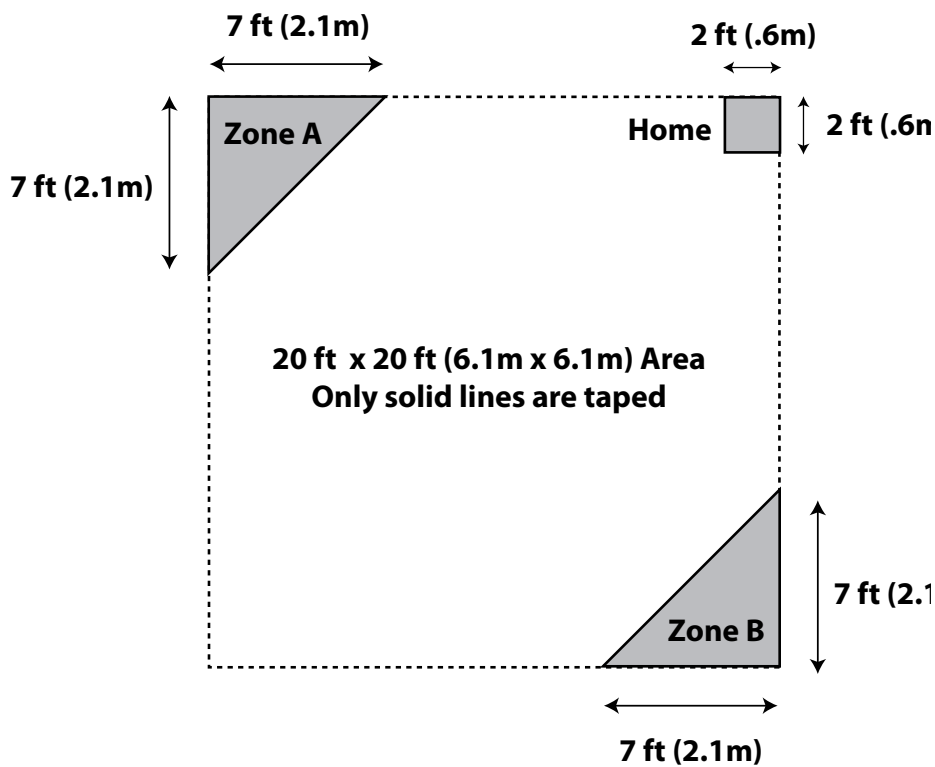
In addition to the above requirements, the team must present **TWO** creations called '*Side Trips*' that show off their interests, skills, areas of strength, and talents. The team may create anything they wish for *Side Trips* including props, music, technical gadgets, costumes, physical actions etc. **Teams are not permitted to plug anything presented as *Side Trips* into an AC outlet.**

1. The team must present both *Side Trips* as part of the eight-minute Presentation and each *Side Trip* should have a meaningful connection to the team's *Central Challenge* solution. Each *Side Trip* must be described briefly on the *Tournament Data Form* found at the end of this Challenge.
2. A *Side Trip* may not be a specific item that is required in the *Central Challenge* that is already being evaluated. A *Side Trip* MAY be a single unique PART of a required item, as long as it can be evaluated as a stand-alone item. Both *Side Trips* may be presented at the same time ONLY IF both can be easily identified and scored separately. Examples of these can be found in the *Rules of the Road*.
3. Each *Side Trip* will be evaluated in two ways: for the Creativity and Originality of the *Side Trip*, and for the Quality, Workmanship, and/or Effort that is evident. Evaluation of *Side Trips* is subjective.

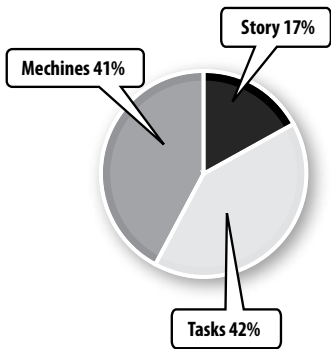
C. Presentation Site

1. **Floor Surface:** Destination ImagiNation strongly suggests that the Presentation Site be a large space with a hard floor such as wood, linoleum, concrete or very short-napped carpet. Teams should be prepared to deal with a variety of floor surfaces.
2. **Site Size:** The minimum required overall size of the Presentation Site is 20ft. x 20ft. (6.1m x 6.1m), but teams may use any additional space that Tournament officials designate as available. The 20ft. x 20ft. site will not be taped.
3. **Electrical Power:** NO plug-in AC power will be allowed during the Presentation of this Challenge. Nothing may plug in – not musical instruments, not Machines, not battery chargers, not sound equipment, NOTHING.

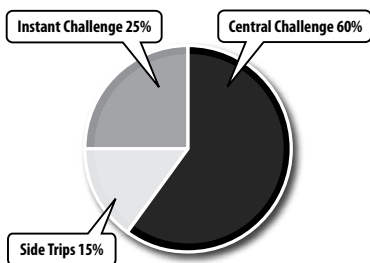
Figure 1



D. Reward Points



ELEMENT		POINTS	DETAIL
Central Challenge		Up to 240	A
1.	Machines	Up to 100	A.2
	a. High Scoring Machine		A.2
	i. Technical Innovation of propulsion and movement	Up to 30	A.2i
	ii. Design and Construction	Up to 15	A.2i
	b. Low Scoring Machine		A.2
	i. Technical Innovation of propulsion and movement	Up to 20	A.2.i
	ii. Design and Construction	Up to 10	A.2.i
	c. Technical Innovation of Task attempts	Up to 25	A.3
2.	Tasks	0 to 100	A.3
	a. Tasks completed – 8 points each	0 to 96	A.3
	b. Bonus for extra stacking – 1 point per item over 3 high	0 to 4	A.3
3.	Story	Up to 40	A.4
	a. How well the Story presents the required theme of cooperation	Up to 15	A.4.a
	b. The effective representation of the Nation other than the team's own	Up to 10	A.4.b
	c. How the team's Story integrates the Tasks	Up to 5	A.4.c
	d. Originality and overall effect of the team's Story	Up to 10	A.4.d



Side Trips		Up to 60	B
1.	Side Trip 1	Up to 30	B.3
	a. Creativity and Originality	Up to 15	B.3
	b. Quality, Workmanship, or Effort that is evident	Up to 15	B.3
2.	Side Trip 2	Up to 30	B.3
	a. Creativity and Originality	Up to 15	B.3
	b. Quality, Workmanship, or Effort that is evident	Up to 15	B.3

In this *Central Challenge*, there are three scoring sections: Machines, Tasks and Story. **The scores for each of these sections will be scaled separately.** The scaled scores for each section are then added together to calculate the team's Raw Score for the *Central Challenge*.

What does it mean to 'scale' the score? 'Scaling' the score means that the team having the highest score in each section of the Challenge will receive the maximum score for that section (i.e. Story, 40 points). The scores for all other teams in that Level will be based on the percentage of their score compared to the team with the highest score.

For example:

Scaled Score for Tasks: A team's Raw Score for the Tasks is the sum of the scores that they receive for the completion of the Tasks and the bonus points for Stacking, as described in A.3. Within each Competition Level, the team with the highest Raw Score for Tasks will receive 100 points for their Scaled Score for Tasks. The Scaled Score for Tasks for all other teams in that Level will be determined using this formula:

$$\text{Scaled Score for Tasks} = (\text{Raw Score for Tasks} \div \text{highest Raw Score for Tasks}) \times 100$$

So, if Team A has a Raw Score of 88 for their Tasks + 4 bonus points for stacking = 92 (which is the highest Raw Score in that Level at their Tournament) and Team B (who is in the same Level) has a Raw Score of 68, the Scaled Score for Team A would be 100 points and the Scaled Score for Team B would be $(68 \div 92) \times 100 = 73.91$.

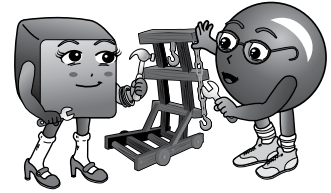
This scaling process is also applied to the remaining sections: Machines and the Story. The scaled scores for the three different *Central Challenge* sections will then be added together to equal the total Raw Score for the *Central Challenge*. This Raw Score for *Central Challenge* is scaled again, and combined with the *Side Trip* and *Instant Challenge* scaled scores as described in the Scoring section of the *Rules of the Road*.

By scaling the scores for each Challenge section, no section will lose its value relative to the other sections because the Appraisers for that particular section scored particularly low or high at the Tournament

Tournament Data Form

Challenge A: Operation Cooperation

Page 1 of 2



Team Name: _____

Team Number: _____ - _____ Level: **EL ML SL UL**

School/Organization: _____

To our Teams and Team Managers: Help your Appraisers identify the required elements of your Challenge solution so they can award you all of the points you have earned. Please fill this form out completely and neatly. For Elementary Level teams only: Team Managers MAY fill out the form, writing out the words dictated by the team.

PART ONE: Required Paperwork

At the Tournament Presentation Site, the Prep Area Appraiser will ask for your team's forms. A complete checklist of the required forms is below. None of the forms listed below can be used as a scoring item.

Your team needs:

- _____ **Five copies** of this completed two-page *Tournament Data Form*. **Be sure to copy both pages of this form.** This is PAGE ONE of the form. Page Two may be copied onto the back of this sheet. This form may not be used as a scoring item.
- _____ **Two Copies** of the completed *Declaration of Independence*. Blank copies of this form can be found in the *Rules of the Road*. One copy of this form is for *Team Challenge*, the other copy of is for you to take to *Instant Challenge*.
- _____ **One Copy** of the completed *Expense Report*. This form can be found in the *Rules of the Road*. Be sure to bring copies of your receipts in case you are asked for them, but **it is not necessary to attach them to the form.**
- _____ **Team Identification Sign:** This will tell the Appraisers and the audience who you are. It must list your Team Name, Team Number, School/Organization (if different from Team Name), and Level. It cannot be scored. See the *Rules of the Road* for more information.

PART TWO: Side Trip Choices: Brief Description of each Side Trip

Side Trip 1: What is your Side Trip? _____

Please write a brief Description of your *Side Trip*. Make sure that Appraisers know **exactly** what you want them to evaluate. What would you like them to know about *Side Trip 1*?

Side Trip 2: What is your Side Trip? _____

Please write a brief Description of your *Side Trip*. Make sure that Appraisers know **exactly** what you want them to evaluate. What would you like them to know about *Side Trip 2*?
