Acting Out CoronaSPHERES
Instructor's Guide
Version 1.1
Game duration: Approximately one hour

1 Objectives

- To help students understand the CoronaSPHERES game better by acting it out in person
- To help students understand the choices they have in designing their game strategies
    - Strategy development for the "Acting out CoronaSPHERES" activity is intended to be student driven. Encourage students to try an idea and see what happens.
- To help students begin to develop a strategy for coding their players in the competition
    - Important: Modifications have been made to simplify the physical game. This activity is only meant to help students visualize their strategy choices and is not meant to reflect the actual scores that would result from using a similar strategy within the ZR programming environment.
- To further demonstrate to students the importance of accurate instructions in programming

2   Overview

Students will work in teams to create a strategy for the CoronaSPHERES game and then act it out. Two teams will compete to see which team's strategy captures the most pictures in the time allowed while protecting their satellite from solar flares.

<u>Student's Mission</u>:

- Take and upload as many pictures in the time allotted.
    - Create picture taking plan to get the most points based on game scoring algorithm.
- Create a plan to avoid the effects of solar flares.
    - Teams will not know in advance when the solar flare will occur.
    - Students learn how to plan for an unscheduled event.

<u>Game Format</u>: The game is split into 3 phases.

- Phase 1: No solar flares.
    - Students create a picture taking strategy for phase 1
- Phase 2 and 3: With solar flares.
    - Students create both a picture taking strategy and a solar flare plan (described later)
    - During Phase 2 and Phase 3 students will use the SAME picture taking strategy and solar flare plan. This allows students to see how solar flares occurring at two different times impact their proposed strategy.

The game area is laid out as a grid as shown below. This layout allows the students to compete in a similar fashion to the game simulation but uses rectangular zones instead of circular zones for ease of set up.
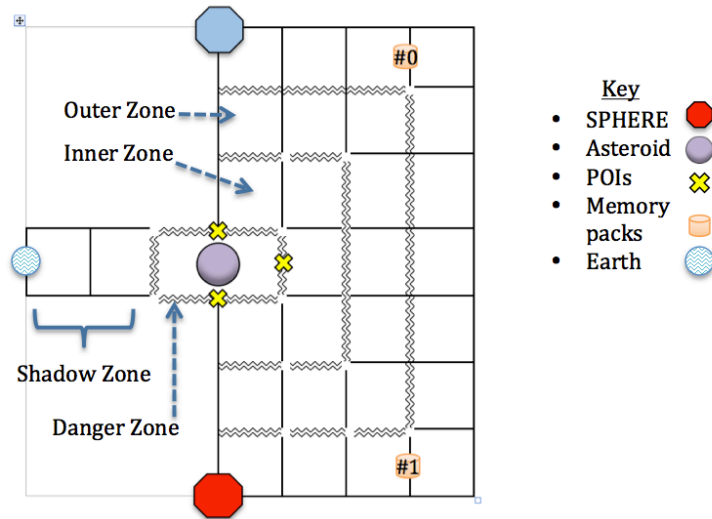
Figure 1: Game layout (4 x 7 yard grid plus 1 x 3 yard side extension)

Note that for simplicity the SPHERES will return to the same starting position for each of the 3 phases.

Before beginning, each team will have 10 minutes to: a) plan an overall strategy, and b) decide the roles of each player.

Teams cannot change their strategy once the game has started.

This guide assumes some familiarity with the CoronaSPHERES game. Details about the CoronaSPHERES game are available in the game overview powerpoint and the game manual.

Notes:

- This activity works well with 10-12 students on a team. Consider combining smaller teams or splitting a larger team.
- Team members will take roles, acting out the parts of: POIs on the asteroid, a SPHERES, the Earth, picture Upload courier, Solar Flare.
- Teammates on the sideline will help give directions to their teammates on the grid based on their preplanned strategy.
- Game duration: Approximately one hour. Each test takes approximately, 45 minutes assuming the game area is already laid out (details below):

    Phase 1 Planning Period: 10 minutes
    Phase 1 (no solar flare) 10 minutes or until complete

    Phase 2,3 Planning Period: 10 minutes
    Phase 2 (1st solar flare): 5 minutes or until complete
    Phase 3 (2nd solar flare): 5 minutes or until complete

    Scoring and discussion: 5 minutes

3   Preparation

In advance

- Review the CoronaSPHERES Game Overview Power point, part 1, with students prior to

introducing this activity
- Read through this guide
- Gather Materials. See Materials Check List. (see page 15)
- Print off Strategy Sheets (see pages 11-12)
- Print out Picture card sheets and cut apart pictures (see page 13)
- Print off Scoring Sheet (see page 14)

Day of Activity

- Set up the Game Grid. See "Grid Set-up Checklist" on the last page of this document. (See page 16).

4   Activity Description and Guidelines

This activity involves two strategy planning phases and three separate game phases. The game phases are similar to the three 60 second periods in the ZR game but do not exactly mirror the game play in the ZR IDE.

Since time is important in the game, the pace of the SPHERES movement on both teams must be coordinated. To do this, each phase of the game is broken into 6 increments with 5 SPHERES actions allowed in each increment. An example for Phase 1 is shown in Figure 2.   The possible actions descriptions that the SPHERES can make are described in Table 1 below.

PHASE 1					
Increment 1 (5 actions)	**Increment 2** (5 actions)	**Increment 3** (5 actions)	**Increment 4** (5 actions)	**Increment 5** (5 actions)	**Increment 6** (5 actions)

Figure 2: Six increments in each phase

Teams must wait for both SPHERES to complete their 5 actions before moving to the next increment.

Assign someone (Eg the students acting as solar flares) to help keep track of the increments by either calling out the increment number or flipping a chart with the numbers written on them.

Table 1: SPHERES Actions/Descriptions

SPHERES Actions/Description	#
Move forward or backward (each step is one action) o A designated teammate will give directions. The teammate must tell their SPHERES what direction to step in order to move along the path that was marked on their strategy sheet. For example: "Take two steps forward and then one step 45 degrees to the right o Students may take normal sized steps	1
Rotate o When SPHERES need to make large rotations (180 or 90 degrees rotations) o Example- at the start of the game when the SPHERES rotates to face the asteroid	1
Take Picture (involves student acting as POIs) o When a SPHERE takes a picture of a POI the student acting as the POI hands the SPHERE a picture card and the SPHERE hands the POI a memory slot (represented by a popsicle stick) ▪ The picture card is specfic to the SPHERE and to where the picture was	1

taken (inner zone or outer zone)
▪ When a SPHERE has no more memory slots (popsicle sticks) it cannot take anymore pictures.
▪ During each phase of the game the SPHERES can only take one picture of a POI from the inner zone and one picture from the outer zone. No exchange occurs if the POI has already given out both its pictures to the SPHERES in that phase.
  ○ Before collecting the picture card be sure to check for bonus points.
▪ A bonus boint is awarded if this is the first picture taken of the POI from one of the zone (The first picture taken in the inner zone and the first picture taken in the outer zone both receive bonus points).
▪ The POI places a bonus point sticker on the correct Picture Card (Correct SPHERES color and location- inner or outer zone). The bonus point is worth 0.5 points.
  ○ Notes:
▪ If both SPHERES arrive in the same square on the grid at the same time to take a picture: Neither team can collect a picture. This is to mimic the effect of collision avoidance.	

Upload Picture (Involves student acting as Upload Courier and Earth)
  ○ SPHERES calls out "Upload".
  ○ The Upload courier comes to pick up pictures and checks to see that the SPHERES is in an upload area.
  ○ The courier gives the SPHERES one popsicle stick (memory slot) back in exchange for each picture
▪ This demonstrates that once pictures are uploaded memory slots become available for other pictures.
  ○ The courier carries the pictures back to Earth. Earth writes down the picture card points on the score sheet and "discard" the picture cards in the container. (Be sure to add 0.5 points for each Bonus point sticker)
  ○ Notes:
▪ SPHERES must be outside both the inner and outer zone or in the shadow zone to upload pictures
	1

Memory Pack (2 actions)
  ○ 1 to rotate (SPHERES must rotate 90 degrees to pick up a memory pack)
  ○ 1 to pickup
  ○ Notes:
▪ Teams arriving at a memory pack at the same time: Neither team receives a memory slot
▪ Teams must follow the pre-planned strategy, even it means sending their SPHERES to a memory pack that has already been picked up
	2

Power down ○ 1 to power down ▪ Powering down is one possible solar flare strategy	1

Power up (2 actions)
  ○ 1 to turn on
  ○ 1 to power up
	2

Solar flare Warning
  ○ Solar flare Warning is announced by one of the students acting as a solar flare by ringing a bell or sounding an alarm
  ○ SPHERES must continue to follow their picture taking strategy up until the point when they have planned to switch over to their solar flare plan.
▪ Remember to follow the steps exactly as planned even if it does not turn out the way you had hoped!
	n/a

Solar flare Increment (applies to Phase 2, 3 only)	5 (1

o Solar flare increment is announced by ringing a bell or sounding an alarm	increment)
o If the SPHERES is in the shadow zone the SPHERE is safe and does not lose points or pictures.	
o If the SPHERES is NOT in the shadow zone the SPHERES will lose pictures and points as follows:	
o Lose Pictures	
▪ If SPHERES is NOT in the shadow zone during the solar flare it will lose all its pictures that have not yet been uploaded. This is true whether or not it is **powered or unpowered**	
▪ The student acting as the solar flare takes any pictures that the SPHERES has not uploaded and "discards" them (no points awarded)	
o Lose Points	
▪ SPHERES that are NOT in the shadow zone during a solar flare lose points depending on whether it is powered or unpowered. (The number of points lost are modified slightly for this activity)	
o **powered on- lose 4 points**: The student acting as the solar flare takes 4 points (marbles or florist glass) from the SPHERES's bucket	
o **powered down/off- lose 2 points**: The student acting as the solar flare takes 2 points (marbles or florist glass) from the SPHERES's bucket)	
o Notes:	
▪ A SPHERES in the shadow zone during a solar flare may call picture upload as part of their solar flare plan	
After Solar flare Increment o SPHERES must begin with the next step in its picture taking plan starting from where it was interrupted by the solar flare plan. (eg. move to, or upload, or take pic) ▪ Follow the steps exactly as planned even if the next planned step does not make sense from your location after the solar flare	n/a

4.1   Phase 1 Planning Period

Time: approximately 10 minutes

Part 1: Strategy Sheets
Give each team two copies of the Strategy Sheet (see pages 11-12) to**:**
- Decide the roles of each player,
- Plan an overall strategy for Phase 1. Encourage students to pick a strategy and see what results from that strategy.

Only ask students to complete the Phase 1 Picture Taking strategy durig the Phase 1 planning period. Students will create their solar flare plans until after completing Phase 1.

Have students fill in the Strategy Sheet by drawing their planned picture taking path on the game grid with letters written on the path to indicate the location of specific actions:
- R= rotate
- POI= take picture
- U= upload picture
- M= pick up memory pack

Part 2: Set up
- Distribute costumes for the students:
    - Lanyards for "SPHERES"
    - Others as desired

- To each POI give:
  - I set of 4 picture cards (Blue SPHERES inner and outer picture, Red SPHERES inner and outer picture)
  - 2 bonus point stickers. Students will place one sticker on the first inner and outer zone picture taken of them
- To Earth give: Score sheet
- Solar flare: Solar flares can help count off increments during phase 1
- Send students to their starting positions for Phase 1 (SPHERES will pick up buckets with 6 points, and two memory slots.)

4.2   Phase 1 Gameplay:

Phase 1 Goal: Teams must guide the SPHERES to take and upload pictures of points of interest (POIs).

Arrows indicate direction the SPHERES are facing at game start
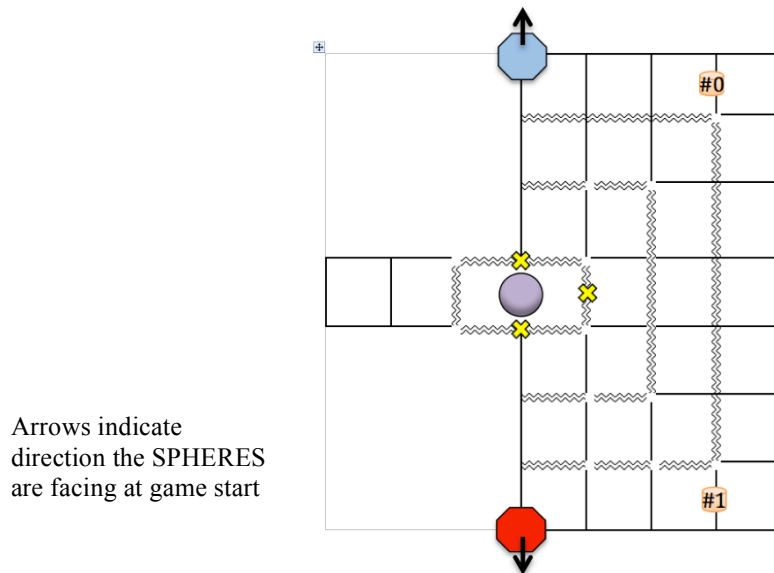
Figure 3: SPHERES initial positions

Phase 1 Game play:

The players from each team acting as SPHERES will begin on opposite ends of the grid, with their backs facing the asteroid. as shown in Figure 3 above.

The rest of the team and the team leaders from both teams will call off the increments from 1 to 6 in Phase 1, with a pause between to allow the SPHERES to make 5 separate actions during each increment. (See Action/Descriptions Table 1 above.   SPHEREs should follow the picture taking plan written on the strategy sheet.

After completing all 6 increments:

- The SPHERES must stop where they are. This represents the end of the Phase 1 period. If the SPHERES did not reach the end of their planned path in Phase 1 by the end of increment 6, they will stop where they are and will not complete their phase 1 plan.

- SPHERES will give Earth any pictures that were not uploaded by the end of Phase 1. IMPORTANT: These will be only counted as 0.1 point each.

- Earth will tally up all Phase 1 points so far on their score sheet (except for the points in the SPHERES bucket).
    - Uploaded pictures
    - Number of bonus points (0.5 points each)
    - Pictures not uploaded that are still in the SPHERES hand at the end of Phase 1 (0.1 point each)
    - Note that points in the SPHERES bucket will only be counted at the very end.

Time: Approximately 10 minutes

4.3   Phase 2 and 3 Planning Period

Time: approximately 10 minutes

Now that the teams have completed phase 1 and are more familiar with the game they are ready to create their solar flare plans. They may also choose to modify their picture taking strategy.

Part 1: Create a Solar Flare Plan

Give the team time to plan out their strategy for Phase 2,3 including a solar flare plan. This plan will provide the instructions the SPHERE will follow after it receives the warning about the upcoming the solar flare period.

Solar flares can be expected during increments 3-6 in this activity as shown in Figure 4.

		Possible Solar Flare Increments			
Increment 1	Increment 2	Increment 3	Increment 4	Increment 5	Increment 6

Figure 4: Possible Solar Flare increments

SPHERES will be given notice of an incoming solar flare two increments in advance of the solar flare. For example, if the solar flare is expected in increment 4 the SPHERE will receive a warning in increment 2 as shown in Figure 5 below.

		Possible Solar Flare Increments			
Increment 1	Increment 2	Increment 3	Increment 4	Increment 5	Increment 6
	WARNING HERE		*SOLAR FLARE HERE*		

Figure 5: Warnings are given two increments in advance of a solar flare

As part of their solar flare plan students need to decide how soon after receiving the warning they want to start their solar flare plan.

- Example A. If the solar flare plan includes moving to the shadow zone, students should decide when to start moving their SPHERE to the shadow zone. If students think they need 6 steps to get to the shadow zone they would start their solar flare plan two increments before the solar flare increment with their last action (action 5) in that increment. See shaded area in Figure 6A below. The shaded boxes indicate actions dedicated for the solar flare plan. Remember when students make their plan, they will not know exactly where their SPHERE will be when the solar

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flare hits.

- o Example B. If the solar flare plan is to simply power down the SPHERE, which takes only 1 action, students may decide to initiate their solar flare plan with their very last action before the Solar Flare increment begins. See shaded area in Figure 6B below.

Solar flare plans can be more detailed than the two examples above with additional details besides moving or powering down. For example, students may decide to check if they have photos and try to move to a preselected upload location to upload pictures before powering down.

WARNING HERE		SOLAR FLARE HERE	WARNING HERE		SOLAR FLARE HERE
Increment SF-2	Increment SF-1	Solar Flare Increment	Increment SF-2	Increment SF-1	Solar Flare Increment
Solar flare minus two increments	*Solar flare minus one increments*		*Solar flare minus two increments*	*Solar flare minus one increments*	
1	1	-	1	1	-
2	2	-	2	2	-
3	3	-	3	3	-
4	4	-	4	4	-
5	5	-	5	5	-
(A)			(B)		

Figure 6: How soon after the warning will you start your solar flare plan ?
A) Solar flare plan shown includes 6 actions before the solar flare increment
B) Solar flare plan shown includes 1 action before the solar flare increment

Part 2: Strategy Sheets
A) Have students fill in the Strategy Sheet with both their picture taking plan and their Solar Flar Plan.
B) Give the students acting as solar flares (one from each team) a strategy sheet to **secretly** pick the solar flare time and count back two increments to determine when they need to give their advance warning. They should choose a different increment for the solar flare in Phase 2 and Phase 3.

Part 3: Set Up

- As needed switch roles. For example have new students take the POI roles.
- Make sure that each POI has:
  - o I set of 4 picture cards (Blue SPHERES inner and outer picture, Red SPHERES inner and outer picture)
  - o 2 bonus point stickers. Students will place one sticker on the first inner and outer zone picture taken of them
- SPHERES: Give each SPHERE two memory slots. The points in the bucket do not change.
- Solar flare: Give the students acting as solar flares a bell to use announce the beginning of the warning increment and to announce the beginning of the flare increment.
- Send all students back to their starting positions as shown in Figure 3

4.4   Phase 2 and 3 Game play:

Phase 2, 3 Goals: Teams must guide the SPHERES to take and upload pictures of POIs while responding to solar flares.

Phase 2, 3 Gameplay:

Selected teammates from the sidelines will give directions to the SPHERES as before. The rest of the team and the team leaders from both teams will count to increment 6, with a pause after each count to take 5 separate actions during each increment.

Before the Warning Increment:

Play game as in Phase 1.

At the beginning of the Warning Increment:

- o   The solar flares will ring their bell and give the 2-increment advance warning.
- o   SPHERES should check their Solar flare plan to see when they need to start following their solar flare plan.
- o   SPHERES must continue to follow their picture taking strategy up until the point when they have planned to switch over to their solar flare plan. They should follow the steps exactly as planned even if it does not turn out the way they had hoped!

Solar Flare increment
- o   Solar flares will ring a bell or sound an alarm to announce the solar flare.
- o   SPHERES will not move during this increment.
- o   If the SPHERES is in the shadow zone the SPHERE is safe and does not lose points or pictures.
- o   If the SPHERES is NOT in the shadow zone the SPHERES will lose pictures and points as follows:
- o   Lose Pictures
    - ▪   If SPHERES is NOT in the shadow zone during the solar flare it will lose all its pictures that have not yet been uploaded. This is true whether or not it is **powered or unpowered**
    - ▪   The student acting as the solar flare takes any pictures that the SPHERES has not uploaded and "discards" them (no points awarded)
- o   Lose Points
    - ▪   SPHERES that are NOT in the shadow zone during a solar flare lose points depending on whether it is powered or unpowered. (The number of points lost are modified slightly for this activity)
        - o   **powered on- lose 4 points**: The student acting as the solar flare takes 4 points (marbles or florist glass) from the SPHERES's bucket
        - o   **powered down/off- lose 2 points**: The student acting as the solar flare takes 2 points (marbles or florist glass) from the SPHERES's bucket)
        - o
After Solar flare Increment
- o   SPHERES must begin with the next step in its picture taking plan starting from where it was interrupted by the solar flare plan. (eg. move to, or upload, or take pic)
- o   Follow the steps exactly as planned even if the next planned step does not make sense from your location after the solar flare

After completing all 6 increments for Phase 2:

- •   The SPHERES must stop where they are. This represents the end of the Phase 2 period.
- •   SPHERES will give Earth any pictures that were not uploaded by the end of Phase 1. IMPORTANT: These are only counted as 0.1 point each.
- •   Earth will tally up all Phase 2 points so far on their score sheet

Phase 3: Repeat Phase 2 with a new solar flare increment

During Phase 2 and Phase 3 students should use the SAME picture taking strategy and solar flare plan. This allows students to see how solar flares occurring at two different times may impact their proposed strategy differently.

<u>After completing all 6 increments for Phase 3:</u>

- The SPHERES must stop where they are. This represents the end of the Phase 3 period.
- SPHERES will give Earth any pictures that were not uploaded by the end of Phase 3. IMPORTANT: These are only counted as 0.1 point each.
- Earth will tally up all Phase 3 points on their score sheet including:

Time: Approximately 5 minutes

4.5   End of Competition and Scoring

Once time is up Earth scorekeeper will count the number of marbles or florist glass still remaining in the SPHERES bucket and add this to the total score.

Have each team describe their strategy and compare their scores. The team with the highest score wins that match.

Strategy Sheet (page 1 of 2)

Assign roles for your team:
o SPHERES: _____
o Solar Flare (works with other team's solar flare): _____
o Points of Interest POIs (this role is shared with the other team- total 9):
    1) _____ 2) _____ 3) _____ 4) _____ 5) (_____)
o Earth (your team's score keeper): _____
o Picture Upload Courier: _____
o Person who give SPHERES directions: _____

Phase 1 Picture Taking Strategy (No solar flares):

Things to decide:

A) Do you plan to rotate the SPHERES (R)?

B) Do you plan to pick up a memory pack (M)?
      If so which one? When will you pick it up?

C) Which POI will you photograph first, second, etc.?
      Will you photograph the POI from the inner or outer zone? (**POI**)

D) When will you upload photos? Where will you go to upload photos? (**U**)
      Remember you can store only as many photos as memory slots.

A) Circle one: Blue SPHERES / Red SPHERES
B) Draw your path in order planned
C) Write the letters R, POI, U, M on the path to indicate each of these actions.
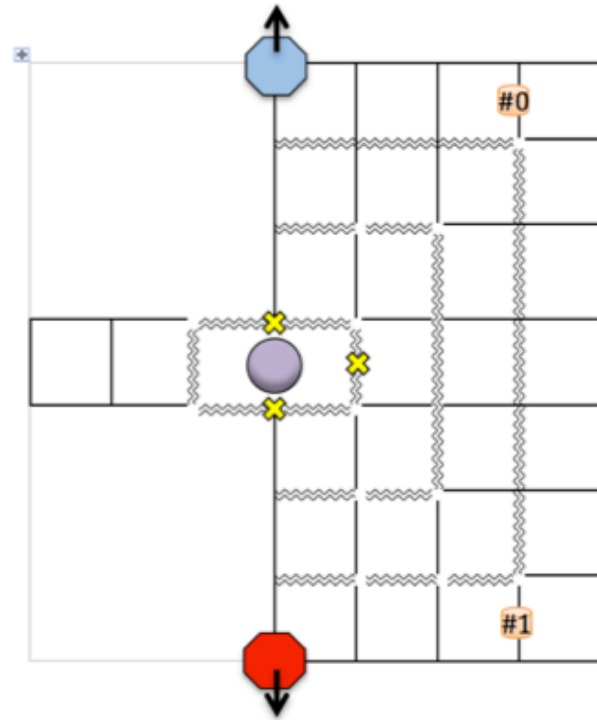
SPHERES Actions	#
Move (one step)	1
Rotate	1
Take Picture	1
Upload Picture	1
Memory Pack (rotate, pickup)	2
Power down	1
Power up (turn on, power up)	2
(Solar flare Increment)	5

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Strategy Sheet (page 2 of 2)

Phase 2,3 Picture Taking Strategy:

A) Draw path in order planned: include R, POI, U, M
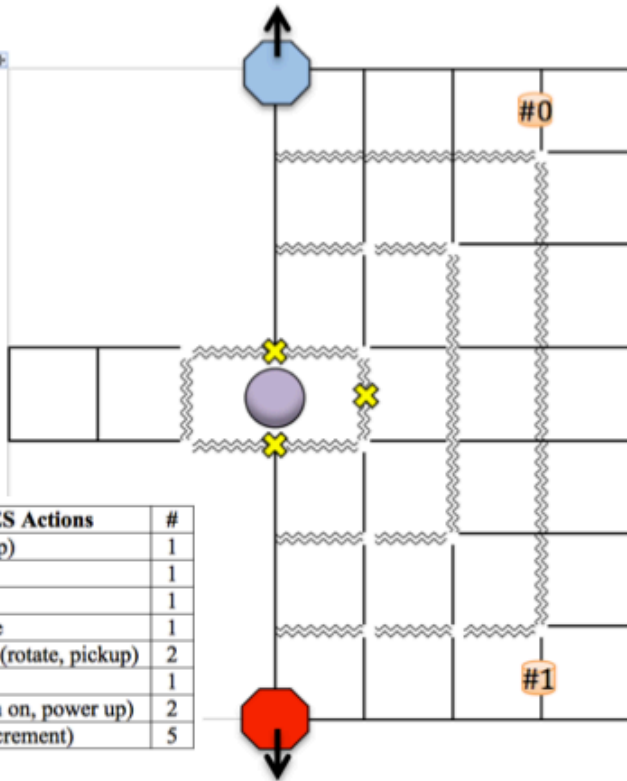
SPHERES Actions	#
Move (one step)	1
Rotate	1
Take Picture	1
Upload Picture	1
Memory Pack (rotate, pickup)	2
Power down	1
Power up (turn on, power up)	2
(Solar flare Increment)	5

For scheduling solar flares: (Only completed by students acting as solar flares)
A) Select solar flare increment. B) Identify warning increment (SF-2))

Possible Solar Flare Increments					
Increment 1	Increment 2	Increment 3	Increment 4	Increment 5	Increment 6

Solar Flare Plan:

A) Circle one: Power off / Move to shadow zone

B) Use the chart to the right to show how soon after the warning you will stop following your picture taking strategy and start following your solar flare plan.

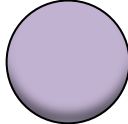(shade in boxes used for your solar flare plan.)
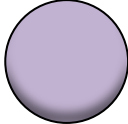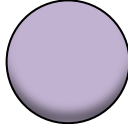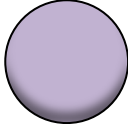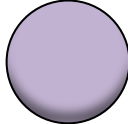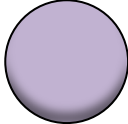
WARNING HERE		SOLAR FLARE HERE
Increment SF-2	Increment SF-1	Solar Flare Increment
Solar flare minus two increments	Solar flare minus one increments	
1	1	-
2	2	-
3	3	-
4	4	-
5	5	-

C) Write down any other details here:
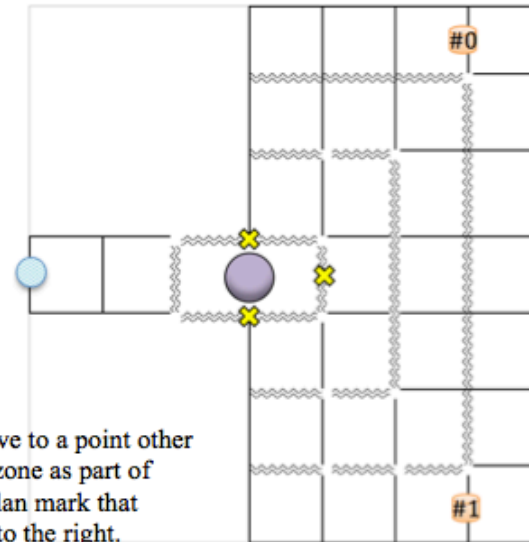
D) If you plan to move to a point other than the shadow zone as part of your solar flare plan mark that point on the grid to the right.

Picture Cards: Each row = 1 set of cards. Give 1 set of cards to each POI. (Print on card stock or attach to 3x5 cards; Cut apart along shaded lines.)

BLUE SPHERES **2 points** Inner Zone Picture	BLUE SPHERES **3 points** Outer Zone Picture	RED SPHERES **2 points** Inner Zone Picture	RED SPHERES **3 points** Outer Zone Picture
BLUE SPHERES **2 points** Inner Zone Picture	BLUE SPHERES **3 points** Outer Zone Picture	RED SPHERES **2 points** Inner Zone Picture	RED SPHERES **3 points** Outer Zone Picture
BLUE SPHERES **2 points** Inner Zone Picture	BLUE SPHERES **3 points** Outer Zone Picture	RED SPHERES **2 points** Inner Zone Picture	RED SPHERES **3 points** Outer Zone Picture

Earth's Score Sheet

PHASE 1	Calculations	Points
Uploaded pictures (2 or 3 points each)		
Bonus points (0.5 points each)	_____ x 0.5=	
Pictures not uploaded at end of Phase 1 (0.1 points each)	_____ x 0.1=	
	Phase 1 total	

PHASE 2	Calculations	Points
Uploaded pictures (2 or 3 points each)		
Bonus points (0.5 points each)	_____ x 0.5=	
Pictures not uploaded at end of Phase 2 (0.1 points each)	_____ x 0.1=	
	Phase 2 total	

PHASE 3	Calculations	Points
Uploaded pictures (2 or 3 points each)		
Bonus points (0.5 points each)	_____ x 0.5=	
Pictures not uploaded at end of Phase 3 (0.1 points each)	_____ x 0.1=	
	Phase 3 total	

END OF GAME-points in bucket	Calculations	Points
Number of marbles/florist glass left in the SPHERES bucket (1 points each)	_____ x 1=	
	Points in Bucket	

	Points
PHASE 1 total	
PHASE 2 total	
PHASE 3 total	
END OF GAME-Points in Bucket	
GAME TOTAL	

Materials Check List

The quantities given below are for one grid. Multiply the quantities given by the number of grids needed. We recommend 1 grid per every two teams involved in the activity at the same time. This activity works well with 10-12 students on a team. Consider combining smaller teams or splitting larger teams.

Item /function	Qty per grid	# grids	Total Qty (qty per grid) X (# grids)	Assigned to:
Rolls of Blue Tape (60 yds rolls) or Spray Chalk • To create game grid	2			
Yard sticks or measuring tape • To help layout game grid	1			
Picture card sheets, printed and cut apart (see page 13 or have students create their own) • Print 1 sheet and reuse cards after each phase • Print extra sheet as back up	2			
Strategy sheets, printed (see page 11-12) • To document strategy- 2 per team plus 2 extras	6			
Popsicle sticks • Two given to each SPHERES at start of game • One placed in each of two memory pack containers at start of game • Extras kept at Earth	8			
Bag of marbles or florist glass • Represent points • Place 6 pieces in each SPHERES bucket at start of game	18			
Roll of 50 stickers (motivational stickers or colored dots) • Used to keep track of the bonus points • 1 roll is enough for both teams	1			
Small bucket • Carried by each student "SPHERES" for points, memory slots, photos	2			
Small containers/boxes • One for each of the two memory packs • Two at Earth's location, one for each team	4			
Score sheet for Earth (score keeper) (see page 14) • One in each container at earth	2			
Bell or other "alarm" • Used by students acting as "Solar Flares" to announce warning and flare period	1			
Optional: Bucket with ball/beach ball • Place ball on the bucket to represent the asteroid.	1			
Optional: Costume for SPHERES- Lanyard with pretend camera (one red, one blue)	2			
Optional: Costumes or identifying signs for other student roles	As needed			
Optional: Flip chart or White Board to keep track of increments within each phase	1			
Pen/pencil	4			

Grid Set-up Check List
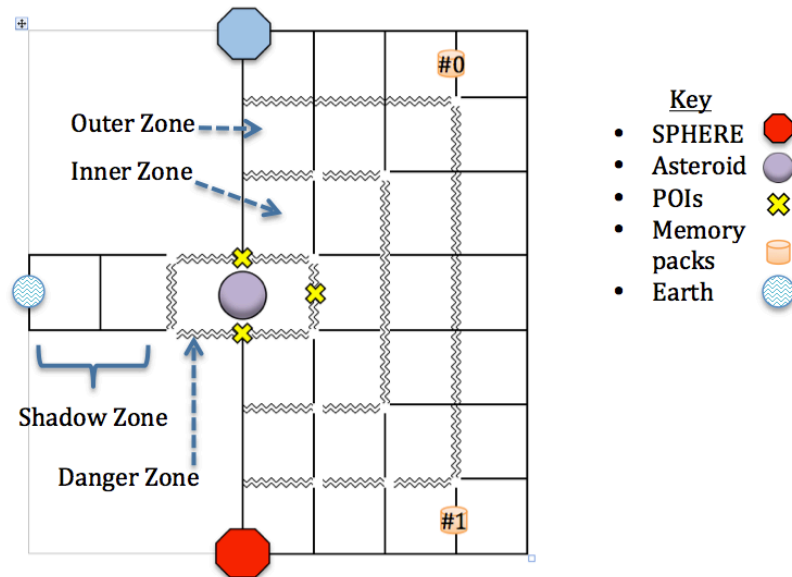
Figure 7: Game Set Up

- Lay out the 4 x 7 yard grid with blue tape or spray chalk
  - Highlight the Zone markings, as shown with squiggly lines in the figure.
    - Make lines wider or a different color (for example, use double wide tape or add markings to tape with a sharpie)
- Add shadow zone region (2 x 1 yard)

- Place the following items on the grid as shown above:

  - POI locations Add tape marks to indicate with an "x" as shown.
  - Memory Packs: Set down two containers representing memory packs (shown as #1 and #2). Place 1 popsicle stick, representing an extra memory slot, in each memory pack container.
  - Set down two containers at Earth location. Place 4 popsicle sticks in each Earth container
  - SPHERES bucket: Set down two buckets at SPHERES locations.
    - Count out 6 marbles or florist glass and place in bucket
    - Place 2 popsicle sticks representing memory slots in each bucket
  - Asteroid: Optional: Place ball/beach ball onto a bucket to represent the asteroid.