

# Public Impacts Summative Evaluation: Study 3

Year 4 Progress Report

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## Executive Summary

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The NISE Net Public Impacts Summative Evaluation focuses on measuring the public outcomes and impacts of NISE Net activities. The design of the evaluation studies is driven by a program theory model that maps the pathways NISE Net has developed for delivering nanoscale science, engineering and technology (NSET) programs and exhibits to the public, as identified by the summative evaluation team.

Built into the NISE Net program theory model is an assumption that the Network will reach a large number of people by distributing the Network's public outreach efforts across a large number of institutions. The decentralized nature of the Network, however, makes it difficult to know how many people are being reached through these efforts. This study, therefore, looked specifically at one question: *Approximately how many people participated in NISE Net public outreach activities during NanoDays 2009?*

This study builds upon the output data from the lead/node institutions that NISE Net administration began to collect during Year 3. This study expands the scope of the visitor counting to include sampling from additional partner institutions that hosted NanoDays events in 2009. This study is intended as a pilot study for the Year 5 study that will cover all of the NISE Net public outreach activities conducted by subawardees, regional partners and appropriators. This would include, but not be limited to, NanoDays 2010. The focus of this study is to pilot test counting methods that approximate actual participation across hundreds of institutions. It was hoped that this pilot test would not only yield information about how to count accurately and effectively, but also provide an approximation of participation for NanoDays 2009.

The counting study took place during NanoDays 2009. This nine-day long event occurred between March 28 and April 5, 2009. Two data collection instruments were utilized to generate an estimate of the total number of public participants during NanoDays 2009: the counting protocol and the NanoDays report. The counting protocol was used to generate estimates for the number of people who participate in a NISE Net program or activity of a certain type. The NanoDays report was used to capture the number of activities of different program types that were hosted across all of the participating institutions. Combining these data provides an estimate of the number of people who experienced NanoDays activities across the 200 institutions that received NanoDays kits. (# of activities x average # of people per activity= total number of participants).

Findings from this study suggest that approximately 371,917 to 425,107 people participated in NanoDays 2009. The data validity review, however, suggests that this is an overestimation of the actual number of participants. The findings section provides details on the data that was used to derive this approximation. The limitations section presents a summary of the possible sources of the overestimation as well as possible ways these sources of the overestimation can be addressed in Year 5.

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## Introduction

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Built into the NISE Net program theory model is an assumption that the Network will reach a large number of people by distributing the Network's public outreach efforts across a large number of institutions. The decentralized nature of the Network, however, makes it difficult to know how many people are being reached through these efforts. This study, therefore, looked specifically at one question: *Approximately how many people participated in NISE Net public outreach activities during NanoDays 2009?*

This study builds upon the output data from the lead/node institutions that NISE Net administration began to collect during Year 3. This study expands the scope of the visitor counting to include sampling from additional partner institutions that hosted NanoDays events in 2009. This study is intended as a pilot study for the Year 5 study that will cover all of the NISE Net public outreach activities conducted by subawardees, regional partners and appropriators. This would include, but not be limited to, NanoDays 2010. The focus of this study is to pilot test counting methods that approximate actual participation across hundreds of institutions. It was hoped that this pilot test would not only yield information about how to count accurately and effectively, but also provide an approximation of participation for NanoDays 2009.

## Methods

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The counting study took place during NanoDays 2009. This nine-day long event occurred between March 28 and April 5, 2009. Two data collection instruments were utilized to generate an estimate of the total number of public participants during NanoDays 2009: the counting protocol and the NanoDays report. The counting protocol was used to generate estimates for the number of people who participate in a NISE Net program or activity of a certain type. The NanoDays report was used to capture the number of activities of different program types that were hosted across all of the participating institutions. Combining these data provides an estimate of the number of people who experienced NanoDays activities across the 200 institutions that received NanoDays kits. (# of activities x average # of people per activity= total number of participants).

### Counting protocol

The aim of the counting protocol was to generate an estimate of the participation for NanoDays activities of varying program types. Program types were used as the primary variable given that certain program types lend themselves to higher rates of participation than others. For example, while there is some variation in the rate of participation for different kinds of exhibits, there is even greater variation between the number of people who participate in an exhibit as compared to a stage demonstration.

***Sampling procedure for selecting programs for counting***

During NanoDays 2009, 16 institutions systematically counted the number of individuals who participated in a select portion of their NanoDays activities. Two weeks prior to NanoDays, these institutions were asked to provide a list of the activities they planned to implement during NanoDays. A random sampling procedure was utilized to select the activities that were counted by each institution. First, the list of proposed activities for each organization was sorted by program type. Then, using a random number generated through [www.random.org](http://www.random.org), activities were chosen from that list based on order. For example, if the list included five stage demonstrations, the random number generator was asked to select a number at random between 1 and 5. If the number 4 appeared, then the fourth stage demonstration on the list was selected for counting. If collection was needed from an activity that was open for a number of hours, such as exhibits or table-top activities, the hour of collection was chosen randomly using the same method. In a few cases, activities could not be selected at random because there were not enough activities of that program type to count. Therefore all instances of that program type needed to be counted. Efforts were made to share the burden across the institutions by keeping the number of activities the institution needed to count proportional to the number of total activities the institution planned to implement.

***Sampling procedure for selecting institutions to participate***

All institutions who received NanoDays kits in 2009 were asked to participate in the counting study. Solicitations were sent via email. One solicitation appeared as part of a message sent by the NISE Network Community team that provided general details and information about NanoDays. Another targeted email was sent to potential participants who were suggested by the regional hub leaders (See Appendix A for a copy of the targeted solicitation email). The regional hub leaders were asked to suggest names and contacts of institutions that were hosting events. These leaders were informed that the study required the participation of institutions that were hosting events of all sizes, and therefore their recommendations should not be based on the size of the event.

In total, 16 institutions agreed to participate. This represents 8% of the 200 organizations who received NanoDays kits in 2009. In appreciation of their efforts, all participating institutions received free NISE Net Buckyballs and free “I’m Made of Atoms” temporary tattoos. These items could be distributed to the public participants during NanoDays.

After all of the institutions signed-up to participate in the counting study, institutions were sorted into categories based on the type of institution. Three institutional types were identified: small museums, large museums, and universities/other. Organizations were classified as either small or large museums based on the statistics and methods provided in the *2007 ASTC Sourcebook of Statistics and Analysis (Association of Science-Technology Centers, 2008)*.

***Procedure for counting visitors***

Two methods were employed to count NanoDays participants: the “clicker” method and the “estimation” method. See Appendix B for details on the counting instructions, definition of “participant” and the reporting form.

- Clicker method: A clicker is a handheld counter. Clickers were used to record the number of people who engaged with a program within a fixed-length of time.

- Estimation method: Estimation was used by educators who run programs in spaces with fixed capacities. For this method, educators made guesses on how many people participated based on the portion of the space that was filled by visitors. For example, if a stage accommodates 150 people and it was half filled, the educator would estimate that approximately 75 people participated.

Each method was pilot tested at the Museum of Science during March 2009. During this pilot test, multiple techniques were employed as a way to examine which method of counting would lead to the most accurate result with the least amount of work for the participating institutions. Through this pilot test, the clicker method was found to be the only accurate method for counting participants in nomadic programs where visitors can wander in and out at will (such as exhibits and cart demonstrations), and other less labor-intensive methods (such as handing out temporary tattoos to participants) did not yield accurate results. The estimation method was found to yield counts that were within 5% of the count derived using the more labor-intensive clicker method.

A number of training mechanisms were employed to ensure that the participating institutions generated a reliable count for the selected activities:

- Participating institutions were each mailed counting packets. These packets contained clickers, clipboards, counting instructions, and multiple copies of the reporting form. The counting packet also included a postage-paid mailing label so the participating institutions could easily send the forms and materials back to the Museum of Science after they finished counting. Appendix C contains the Counting Study Overview included in each packet.
- Participating institutions were emailed electronic versions of the counting instructions and protocols, as well as a list of the activities that needed to be counted. The email highlighted the importance of only counting those activities that were randomly selected by the Museum of Science (without substitutions).
- Participating institutions were asked to participate in a conference call where the procedures for counting were described in detail. Participants were emailed a PowerPoint presentation in advance of this phone call so that they could visually follow along with the directions that were being delivered aurally. (See Appendix D)

These training methods appeared to have produced reliable results. Sixteen of the 17 institutions who agreed to count visitors followed the protocols as requested.<sup>1</sup> A complete list of the 16 institutions can be found in Appendix E.

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<sup>1</sup> There were originally 17 institutions that agreed to participate. Of the 17 institutions, 13 attended the training, 3 followed up individually via email and phone. One institution did not attend the training session and did not follow the written protocol. The limited data that was provided by this institution was eliminated from the dataset, and therefore our final count of participating institutions is 16.

### ***Analysis of the counting protocol data***

Data collected through the counting protocol were used to generate estimates of the rate of participation for programs of specific types when hosted at institutions of certain types. First, the data were categorized into three separate groups based on the institution type (small museum, large museum, university/other). Then, for each institution type, an estimated rate of participation was generated for each program type.

When possible, the estimated rate of participation was the average number of participants for the program type within a certain institution type. In most cases, however, there was an insufficient amount of data and alternative methods needed to be used to generate the estimated participation. For example, as there were not enough Forums held during NanoDays, data collected from over 40 Forum implementations during formative evaluation were used to derive an estimate for Forum implementation. In other cases, data from similar program types were used to derive estimates. In all cases, the most conservative estimate was used. Table 2 summarizes how each estimate was derived.

### **NanoDays report**

Similar to NanoDays 2008, the Network Community team required all institutions that received NanoDays kits to complete a NanoDays report in 2009. This report is submitted electronically through [www.nisenet.org](http://www.nisenet.org) and information from the reports is available for all Network members to view. In 2008, the report focused on collecting narrative data where participating institutions described their NanoDays activities. In 2009, the report requested quantitative data for each institution's NanoDays events. More specifically, NanoDays participants were asked to provide details on how many activities of different types were delivered to the public during NanoDays, and in some cases, how many hours of activity took place during NanoDays. As an added incentive to complete the report, institutions were entered into a prize drawing for a free ASTC conference registration if they completed their report before May 1<sup>st</sup>. As of July 7, 109 institutions completed their NanoDays report (55%).

Another similarity to NanoDays 2008 is the study's assumption that all institutions who received a NanoDays kit utilized it and held a NanoDays event. The NISE Net team responsible for the maintenance and implementation of the online NanoDays report has made efforts to contact individuals who have not yet completed the report to see if any additional tech support was needed because of the report's electronic nature. Of the 91 of institutions who have not completed the online report, only 1 had not and does not plan on hosting a NanoDays event. Several others reported verbally that their NanoDays event are scheduled and will occur at a different time during the year. Because of these checks, it is reasonable to maintain the 2008 ideal of assuming NanoDays participation based on physical NanoDays kit request.

All institutions that completed NanoDays reports were categorized as belonging to one of three institution types (small museum, large museum and university/other) using the same procedure used to sort institutions as the counting protocol.

### ***Analysis of the NanoDays reporting data***

The reporting data was used to generate an estimate of the number of people who participated in NanoDays at each institution. For each program type, the number of



programs run by the institution was multiplied by the estimated rate of participation for a program of that type when implemented at an institution of that type. The totals for each program type were then added together to generate an estimate for the total number of participants at that institution.

Once each institutional total was estimated, a median rate of participation for each institutional type was generated. This information was used to estimate the number of public participants at institutions that did not complete NanoDays reports.<sup>2</sup>

### **Data validity review**

To determine if this protocol yielded an accurate approximation of the NanoDays data, Counting Study institutions that were also NISE Net subawardee institutions were asked to report their institution's attendance for the same week of NanoDays. The NanoDays week attendance was then compared to the estimated participation of the NanoDays event. Two institutions, Oregon Museum of Science and Industry and the Children's Museum of Houston, reported NanoDays week attendance levels that were half of what Counting Study data estimated for the event alone.

Because of the overestimation at these two institutions, further verification took place by comparing estimated participation for museums against an average weekly attendance derived from the January-December 2008 ASTC Governing Members Attendance Report. If the data yielded an estimated NanoDays participation for the institution that was over the institution's 2008 average weekly attendance, then it could be determined that the count did not yield an accurate approximation. If the data estimated a portion of the weekly attendance, it could be determined that the count yielded a plausibly accurate approximation. Of the 23 U.S. institutions listed in the Attendance Report, 9 institutions had participated in NanoDays 2009 and filled out the NanoDays Report. Upon further review of these 9 institutions, it was found that the data for 3 institutions yielded an estimated NanoDays participation that was over the average weekly attendance and therefore determined inaccurate. This method of validity review was used as a way of examining the data for possible overages. Although review was only possible for 9 institutions, this scrutiny provided insight that the overall NanoDays participation estimation is possibly inflated in some instances.

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<sup>2</sup> The median was used as the measure of central tendency because the dataset contained a few outliers that had substantially greater rates of participation than any of the other institutions. The median, therefore, provided a much more conservative estimate for the rate of participation than the mean.

## Findings

Findings from this study suggest that approximately 371,917 to 425,107 people participated in NanoDays 2009. The data validity review, however, suggests that this is an overestimation of the actual number of participants. The following findings provide details on the data that was used to derive this approximation. The limitations section presents a summary of the possible sources of the overestimation as well as possible ways these sources of the overestimation can be addressed in Year 5.

### Counting protocol

In total, 16 institutions counted the number of people who participated in 63 activities during NanoDays 2009. Table 1 details the number of activities that were counted for each program type at each institution type. Table 2 summarizes the estimated rate of participation for each program type at each institution type.

Table 1: Number of activities counted by program type and institution type

	Large Museum	Small Museum	University/Other
Classroom activity	3	0	2
Exhibit	2	0	0
Forum	1	0	1
Lecture	7	4	0
Stage Presentation	6	8	0
Table Top	17	9	3

As so few activities of each program type were available for the counting protocol, the numbers for estimated participation in Table 2 below are possibly inaccurate. For example, although counting occurred at specified random hours and activity types, exhibit data was only collected during peak times because those were the hours listed by the participating institutions. However, the actual exhibits also took place during non-peak times. Therefore, even though the table reflects the lower estimation of the two times when large museum exhibit data was collected, this still may be an overestimation of the rate of participation.

Table 2: Estimated participation based on findings from the counting protocol

Program type	Large Museum	Small Museum	University	How this estimate was derived
Classroom activity	31	31	31	The dataset did not include classroom activities in small museums. Analysis revealed no difference between the average size of the classroom activity for large museums and universities. Therefore, the same number was applied to all three institution types.
Exhibit (participation per hour)	137	35	37	The dataset did not include exhibits in small museums or universities. Therefore, the estimate for table top activities was used. For large museums, only two exhibits were counted. The smaller number was used as an estimate.
Forum	32	32	32	This estimate was derived from the average participation for NISE Net Forums held during Years 1-3 (46 events across 6 museums).
Lecture	48	48	48	No difference was found between the number of participants at the lectures for small and large museums. Therefore, the same number was used across all three institution types.
Stage Presentation	73	25	25	The dataset did not include stage presentations at the universities. Therefore, the lower average from the small museums was used.
Table Top (participation per hour)	65	35	37	Average rate of participation per hour at each institution type.

## NanoDays reports

The NanoDays reports provide information on the number of activities that took place at each reporting institution. As demonstrated by this table, the most common activity across all three institution types was the table top activity/cart demonstration. The most infrequent activities were classroom activities, lectures and forums. This corresponds to the findings from the counting protocol, where few activities were counted in each of these three areas as well.

Table 3: Reported number of activities by program type and institution type<sup>3</sup>

	Large Museum	Small Museum	University/Other
Classroom activity	15	26	59
Exhibit (# of hours)	665	10	314
Forum	25	0	11
Lecture	14	11	28
Stage Presentation	75	41	50
Table Top (# of hours)	2164	978	745

<sup>3</sup> Reported through July 7, 2009

Due to the results of the data validity review, efforts were made to accurately reveal and correct the estimated participation. Table 4 demonstrates the corrected reported number of activities by program type and institution type. The key difference between Tables 3 and 4 lies in the number of hours estimated for exhibit and table-top participation. The lower numbers in Table 4 were derived by capping all reporting institution at a total of 72 hours for each exhibit and table-top activity. Seventy-two hours was used to represent a nine-day NanoDays event with 8 hours per day. Although an institution could implement 3 table-top activities for 72 hours each (providing a total 216 activity-hours), it is likely that the same visitors could have visited each of the three activities if they occurred simultaneously. Limiting at 72, therefore, provides a way of reducing the likelihood of counting a single visitor more than once. This cap, however, does not take into account institutions that had shorter NanoDays events (2 days) with multiple activities, which means that it is still possible to count a visitor more than once even with the cap set at 72 hours. This method corrects 2 of the 3 institutions whose data yielded an estimated participation of more than one week's average attendance.

Table 4: Corrected reported number of activities by program type and institution type

	Large Museum	Small Museum	University/Other
Classroom activity	15	26	59
Exhibit (# of hours)	418	10	278
Forum	25	0	11
Lecture	14	11	28
Stage Presentation	75	41	50
Table Top (# of hours)	1453	812	721

The NanoDays reports were also used to estimate the number of people who participated in NanoDays at each institution. These estimates are summarized in Tables 5 and 6. Table 5 provides the original estimated participation for reporting institutions while Table 6 offers the more conservative results of the corrected estimation. Combined with the findings from the counting protocol shared above, these data estimate that between 246,192 and 299,382 individuals participated in NanoDays through the reporting institutions.

Table 5: Estimated number of participants for reporting institutions

	Large Museum	Small Museum	University/Other
Median number of participants	3884	840	446
Total number of participants	219,953	36,546	42,883

Table 6: Corrected estimated number of participants for reporting institutions

	Large Museum	Small Museum	University/Other
<b>Median number of participants</b>	3884	840	429
<b>Total number of participants</b>	175,329	30,612	40,251

More than 50% of the institutions that received NanoDays kits have not yet completed NanoDays reports. Using the median number of participants for each institution type, an estimate was generated for the number of participants who might have participated in NanoDays activities at these institutions. It is estimated that 125,725 people may have been reached through the non-reporting institutions. (See Table 7)

Table 7: Estimated number of participants for non-reporting institutions

	Large Museum	Small Museum	University/Other
<b>Number of institutions</b>	20	24	65
<b>Estimated participation across non-reporting institutions</b>	77,680	20,160	27,885

## Limitations

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The number of NanoDays participants provided above (between 371,917 to 425,107) is an approximation that is based on data recorded through two different mechanisms: the counting protocol and the NanoDays reports. Each of these protocols has limitations that may have affected the accuracy of this approximation.

### Counting protocol

Only a small portion of the institutions that received NanoDays kits in 2009 agreed to participate in the counting study. It is possible that those who agreed to participate are the most invested in NISE Net and therefore may have done more to advertise their events than those institutions that did not participate in the counting study. Therefore, these institutions may have had higher rates of participation. When generating estimated attendance for each program type, however, the most conservative estimate was used. This was done to counterbalance this possible bias in the counting protocol data.

### NanoDays reports

The NanoDays report data have a number of possible limitations that may have led to overestimations in the number of participants:

- Reporting bias: Institutions that took the time to complete the reports may be more invested in the NISE Net, and therefore may have held more events than the non-reporting institutions. It is also likely that some of the non-reporting institutions did not host NanoDays in 2009.
- Activity counting bias: Each activity was counted as a stand-alone component, and it was assumed that different individuals went to each activity. It is possible that the same individuals visited multiple activities.

To counterbalance the possible overestimations, the median (as opposed to the mean) was used as the measure of central tendency for the institution-level estimates as this was the more conservative approximation. In addition, the number of hours of participation for exhibits and table-top activities were capped at 72 hours. 72 hours was used to represent a complete nine-day NanoDays event with 8 hours of participation each day. Any institution reporting more than 72 hours possibly counted each exhibit component's hours rather than the entire exhibit space's hours and therefore appeared as a clear outlier in the dataset.

In addition to the limitations of the two protocols, there was also a limitation in how the population was defined. This study only focused on those institutions that received physical NanoDays kits. It was possible, however, for some institutions to host NanoDays without receiving a physical kit. The materials needed to host a NanoDays event were all available on-line and could be downloaded for free. If a large number of institutions used the on-line kits, the approximated number of participants generated through this study may be an underestimation.

## Recommendations for next year

This pilot test demonstrates strengths and weaknesses of the counting protocols as well as the NanoDays Report. After discussing further possible ideas with the Committee of Visitors in the meeting scheduled for June, this study's information will be applied to the design of the corresponding study in Year 5 with the following possible recommendations:

- Reform counting protocols to include the number of activities in addition to the number of hours;
- Expand the sampling method to ensure that an equal number of peak and non-peak times are counted;
- Determine an estimate of the number of individuals who participate in multiple activities during one visit;
- Reconsider alternative counting methods already presented to the team. These could include having different counting methods for different scenarios such as one method for an institution that has multiple high-profile activities taking place at the same time, another method for situations where all who enter an area would be participants (e.g. University Fair), etc.;
- Expand NanoDays Report to include a reported number of classroom activities.

## References

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Association of Science-Technology Centers (2008). *2007 Sourcebook of statistics & analysis*. Washington, DC.



## Appendix A: Solicitation email

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Hello,

I'm contacting you because the NISE Network needs your help! This is not mandatory, but it would help you measure your own NanoDays participation and it would help us measure the public impacts of NISE Net. As part of the Network's Summative Evaluation plan, we are interested in obtaining an accurate count of the number of people who have participated in NanoDays activities.

For this study to succeed, we are asking as many institutions as possible to take part in systematic counting of certain activities during NanoDays. Participating institutions will not be required to count visitors during every activity. Instead, they will only need to count visitors during a random sample of their NanoDays programs. Participating institutions would be required to do the following:

- Provide us with a list of proposed NanoDays activities two weeks prior to the start of those activities
- Attend a 1 hour virtual data collection training the week before NanoDays (we'll schedule them at various times throughout the week)
- Count visitors during select programs during NanoDays

This study is an excellent opportunity to get quantifiable data on your institution's visitor numbers and effectiveness of NanoDays - analyzed by NISE Net Research and Evaluation. Not only will you play an integral role in the NISE Net summative evaluation, but you will also receive free give-aways for your visitors and NanoDays data for your institution. This study will also provide you with established counting protocols that can be replicated again and again.

We will provide the institutions with the following: Materials that will assist with visitor counting, including visitor give-aways that can be used for counting (tattoos and/or Buckyballs), clipboards (on loan), photocopied instructions (for distribution to volunteers), and visitor counting clickers (on loan); and Detailed counting protocols.

We will be analyzing institutions, ranging in size (small and large) and type (universities and museums), who plan on presenting a range of activities (for example, an institution that plans to host activity carts and lectures and a Forum would work better than an institution that plans to just host a Forum).

Please let me know if you are willing to participate in our Counting Study by Tuesday, March 10. In that email, please establish a direct contact name and address so I can ship the necessary materials.

Thank you,

Juli Goss

## Appendix B: Counting instructions and reporting form

### Counting Instructions

#### Overview of counting procedures

There are two main methods you will be asked to use to count NanoDays participants: the “clicker” method and the “estimation” method.

- Clicker method: A clicker is a handheld counter you can use to record the number of people who engage in a program within a pre-determined length of time.
- Estimation method: Estimation can be used by educators who run programs in spaces with fixed capacities. For this method, educators approximate how many people participate based on the portion of the space that is filled by visitors. Example: This stage accommodates 150 people and it was half filled, therefore you estimate that approximately 75 people participated. Or, each bench holds approximately 5 people and 4 benches were filled, therefore you estimate that approximately 20 people participated.

The instructions below provide you with information on when and how to use these two methods for your NanoDays activities.

#### Stage presentation/museum theater: Use the Estimation Method

This is a short presentation (15-30 minutes in length) with a defined start and end time. It generally takes place in an open area. Visitors can wander in and out of the program as it is taking place.

How to count participation at a stage presentation/museum theater:

- Before NanoDays, determine the area’s capacity. This is best accomplished by counting ahead of time the total seating and/or standing capacity of the area. It may also help to count the maximum number of people per row of seating as this can increase the accuracy of your estimation.
- During the presentation, the presenter estimates the highest number of participants by comparing the space’s capacity and the fullness of that space (we will assign specific presentations to count).
- If the attendance is low (10-20 people), feel free to just count the audience instead of estimating.
- Count every participant who is at least 3 years old and watches the presentation for at least 5 minutes.
- At the end of the presentation, record the official count on the reporting form.

#### Interpretation cart/table-top activity: Use the Clicker Method

This is an on-going, person-led program where visitors can roam in and out of the program at will. It does not have a defined length of interaction.

How to count participation at an interpretation cart/table-top activity:

- Using the clicker, record the number of visitors who participate in the activity over the course of an hour (we will assign specific hours to count).
- Count every participant who is at least 3 years old who touches something on the cart or pays attention for 5 seconds or more.
- At the end of the hour, record the official count on the reporting form.

**Lecture/Forum/Classroom activity: Use the Clicker Method**

This is a longer program, usually in a closed-door space. It has a fixed-length and visitors typically come and stay. In some cases, advance registration may be required.

How to count participation at a lecture/forum/classroom activity:

- While standing at the entrance, use the clicker to record the number of visitors who enter the lecture/forum activity over the course of the entire program (we will assign specific programs to count).
- Count every participant who is at least 3 years old. If people are allowed to enter after the program starts, continue to count them as long as they see at least 5 minutes of the activity
- At the end of the program, record the official count on the reporting form.

**Exhibit/ Graphic display/ Computer activity: Use the Clicker Method**

This is a stand-alone, unfacilitated experience, typically in a gallery.

How to count participation at an exhibit/graphic display/computer activity:

- Stand in a location where it is easy to see who enters the gallery and whether the visitors engage with the exhibits. If there is more than one entrance, monitor the entrance through which visitors are more likely to enter.
- Using the clicker, record the number of visitors who engage with the exhibit over the course of an hour (we will assign specific hour(s) for counting).
- Count every participant who is at least 3 years old who enters the gallery and touches one of the exhibits or pays attention to it for 5 seconds or more.
- At the end of the hour, record the official count on the reporting form.

## Reporting Form

(Summary of Instructions located on reverse side)

Institution Name: \_\_\_\_\_

Date: \_\_\_\_\_

Activity Name: \_\_\_\_\_

Activity Type: (please check one)

- Lecture
- Forum
- Classroom activity
- Interpretation cart
- Table top activity
- Stage presentation
- Science theater presentation
- Exhibit
- Stand-alone computer station
- Stand-alone graphic display

Data Collection Start Time: \_\_\_\_\_

Data Collection End Time: \_\_\_\_\_

Method of Data Collection (clicker or presenter estimation): \_\_\_\_\_

**Final Count:** \_\_\_\_\_

Initials of person completing this form: \_\_\_\_\_

Notes/Comments. Is there anything specifically regarding this activity that you would like to report to the counting study's evaluator?

## Summary of Instructions

A participant:

- is at least 3 years of age
- during a Cart/Demo/Exhibit – a participant touches something or pays attention for 5 seconds or more
- during a Presentation – a participant pays attention for at least 5 minutes and can be sitting or standing

<b>For this type of activity</b>	<b>Use this method of data collection</b>
Interpretation Cart Table-top Activity Lecture Forum Classroom Activity Exhibit Graphic Display Computer Activity	<p style="text-align: center;"><b>Clicker:</b></p> <p style="text-align: center;">Using the clicker, count every person who participates in the activity</p>
Stage Presentation Museum Theater	<p style="text-align: center;"><b>Estimation:</b></p> <p style="text-align: center;">The person presenting should estimate the highest number of participants based on the capacity of the space.</p>

## **Appendix C: Overview included in mailed counting packet**

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### **Counting Study Overview**

Thank you for participating in the  
NISE Net Summative Evaluation Counting Study!

#### **Box contents**

This box contains all you will need for the NISE Net counting study:

- Clipboard (for easy recording on the spot)
- Clicker (for counting visitors)
- Giveaways (yours to use any way that you choose—you might want to set up a tattooing station or area for buckyball assembly)
- Reporting forms
- Counting instructions
- Self-addressed, pre-paid package return label

#### **How to count**

Please use the enclosed counting instructions document and the reporting form to guide your participant counting.

We will discuss how to fill out the counting study report forms during our scheduled training sessions. Don't forget to sign up for one of the scheduled data collection training sessions at <http://www.doodle.com/y7ndgwewp6kbag6e>.

#### **How to return**

When your event is over and your reports are filled out, all you need to do is resend our box using the enclosed self-addressed, pre-paid package label. If at all possible, please return your materials within one week of your last NanoDays event, and no later than April 15<sup>th</sup>. When you send us the box, please make sure it includes the following:

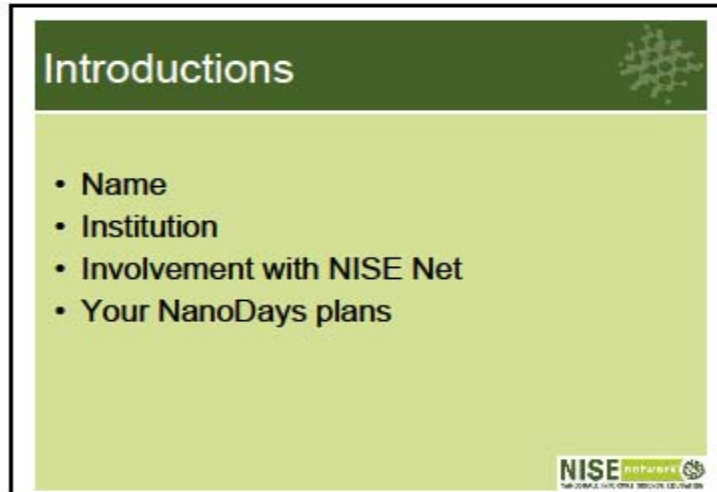
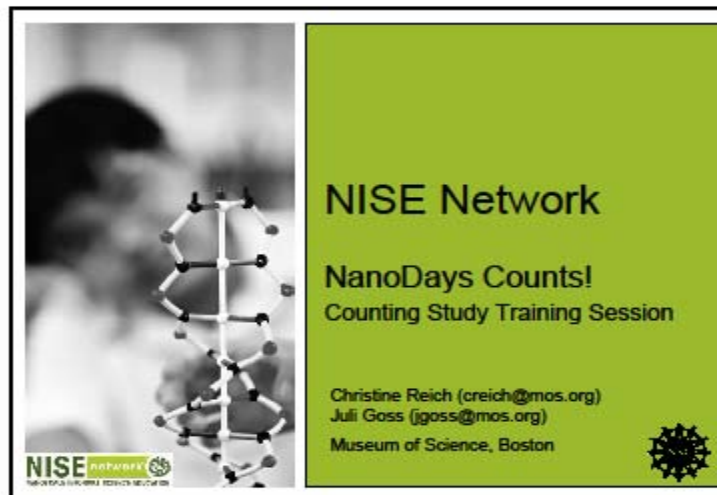
- Clipboard
- Clicker
- All completed reporting forms

You can keep any extra giveaways that you do not use.

#### **Questions?**

If you have any questions, feel free to call or email Juli Goss at [jgoss@mos.org](mailto:jgoss@mos.org) or 617.589.4413.

## Appendix D: Presentation used during conference call training



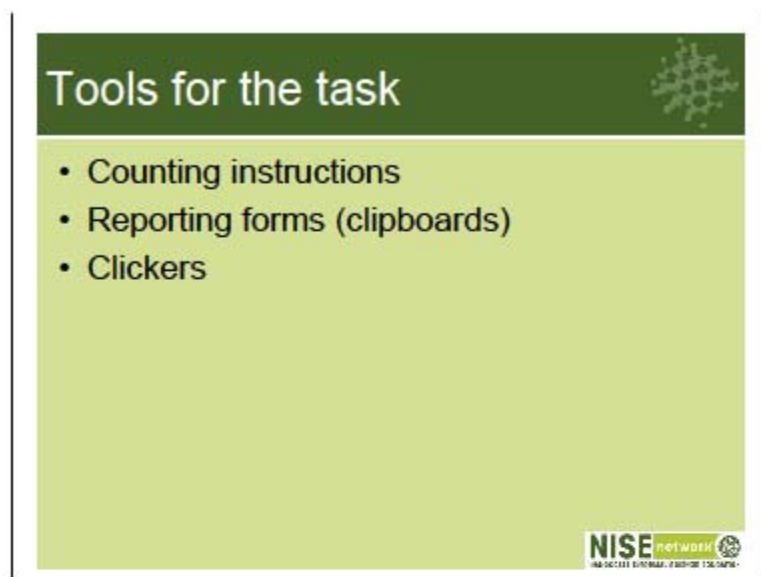
## Counting Study Overview



- Our aim: generate an estimate of how many people participated in NanoDays
- Using two instruments
  - Your counting reports!
  - Online NanoDays reports







Earlier this week, we sent you your NanoDays counting box. This box contains all you will need for the NISE Net counting study:

Clipboard (for easy recording on the spot)

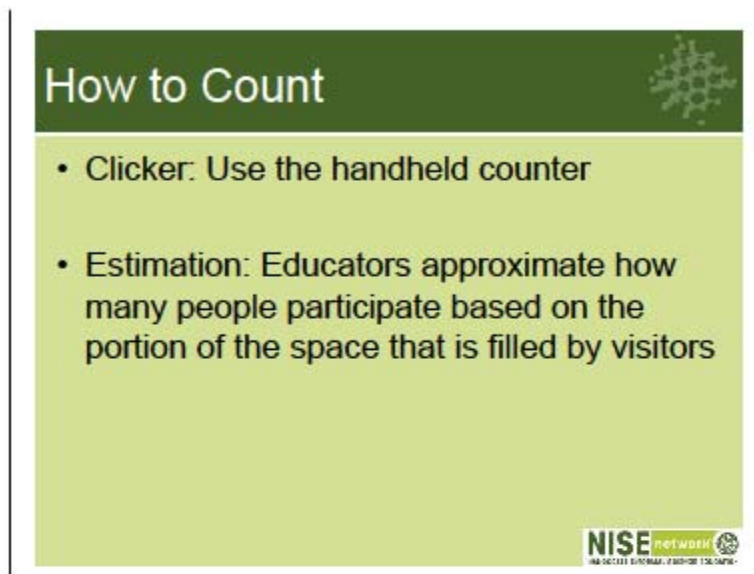
Clicker (for counting visitors)

Giveaways (yours to use any way that you choose—you might want to set up a tattooing station or area for buckyball assembly)

Reporting forms

Counting instructions

Self-addressed, pre-paid package return label



## How to Count

- Clicker: Use the handheld counter
- Estimation: Educators approximate how many people participate based on the portion of the space that is filled by visitors

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There are two main methods you will be asked to use to count NanoDays participants: the “clicker” method and the “estimation” method.

**Clicker method:** A clicker is a handheld counter you can use to record the number of people who engage in a program within a pre-determined length of time.

**Estimation method:** Estimation can be used by educators who run programs in spaces with fixed capacities. For this method, educators approximate how many people participate based on the portion of the space that is filled by visitors.

Example: This stage accommodates 150 people and it was half filled, therefore you estimate that approximately 75 people participated. Or, each bench holds approximately 5 people and 4 benches were filled, therefore you estimate that approximately 20 people participated.



**Stage presentation/museum theater: Use the Estimation Method**

This is a short presentation (15-30 minutes in length) with a defined start and end time. It generally takes place in an open area. Visitors can wander in and out of the program as it is taking place.

How to count participation at a stage presentation/museum theater:

Before NanoDays, determine the area's capacity. This is best accomplished by counting ahead of time the total seating and/or standing capacity of the area. It may also help to count the maximum number of people per row of seating as this can increase the accuracy of your estimation.

During the presentation, the presenter estimates the highest number of participants by comparing the space's capacity and the fullness of that space (we will assign specific presentations to count).

If the attendance is low (10-20 people), feel free to just count the audience instead of estimating.

Count every participant who is at least 3 years old and watches the presentation for at least 5 minutes.

At the end of the presentation, record the official count on the reporting form.

## Counting Stage Presentations: Estimation

- Before NanoDays, determine the area's capacity.
- During the presentation, the presenter estimates the highest number of participants by comparing the space's capacity and the fullness of that space.
- If the attendance is low (10-20 people), feel free to just count the audience instead of estimating.
- Count every participant who is at least 3 years old and watches the presentation for at least 5 minutes.
- At the end of the presentation, record the official count on the reporting form.



### **Stage presentation/museum theater: Use the Estimation Method**

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During the presentation, the presenter estimates the highest number of participants by comparing the space's capacity and the fullness of that space (we will assign specific presentations to count).

If the attendance is low (10-20 people), feel free to just count the audience instead of estimating.

Count every participant who is at least 3 years old and watches the presentation for at least 5 minutes.

At the end of the presentation, record the official count on the reporting form.





**Interpretation cart/table-top activity: Use the Clicker Method**

This is an on-going, person-led program where visitors can roam in and out of the program at will. It does not have a defined length of interaction.

How to count participation at an interpretation cart/table-top activity:

Using the clicker, record the number of visitors who participate in the activity over the course of an hour (we will assign specific hours to count).

Count every participant who is at least 3 years old who touches something on the cart or pays attention for 5 seconds or more.

At the end of the hour, record the official count on the reporting form.

**Counting Table-top Activities:  
Clicker**

- Using the clicker, record the number of visitors who participate in the activity over the course of an hour.
- Count every participant who is at least 3 years old who touches something on the cart or pays attention for 5 seconds or more.
- At the end of the hour, record the official count on the reporting form.

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**Interpretation cart/table-top activity: Use the Clicker Method**

This is an on-going, person-led program where visitors can roam in and out of the program at will. It does not have a defined length of interaction.

How to count participation at an interpretation cart/table-top activity:

Using the clicker, record the number of visitors who participate in the activity over the course of an hour (we will assign specific hours to count).

Count every participant who is at least 3 years old who touches something on the cart or pays attention for 5 seconds or more.

At the end of the hour, record the official count on the reporting form.



**Lecture/Forum/Classroom activity: Use the Clicker Method**

This is a longer program, usually in a closed-door space. It has a fixed-length and visitors typically come and stay. In some cases, advance registration may be required.

How to count participation at a lecture/forum/classroom activity:

While standing at the entrance, use the clicker to record the number of visitors who enter the lecture/forum activity over the course of the entire program (we will assign specific programs to count).

Count every participant who is at least 3 years old. If people are allowed to enter after the program starts, continue to count them as long as they see at least 5 minutes of the activity.

At the end of the program, record the official count on the reporting form.

## Counting Lectures/ Forums/ Classroom Activities: Clicker

- While standing at the entrance, use to clicker to record the number of visitors who enter the lecture/forum activity over the course of the entire program.
- Count every participant who is at least 3 years old. If people are allowed to enter after the program starts, continue to count them as long as they see at least 5 minutes of the activity.
- At the end of the program, record the official count on the reporting form.



### **Lecture/Forum/Classroom activity: Use the Clicker Method**

This is a longer program, usually in a closed-door space. It has a fixed-length and visitors typically come and stay. In some cases, advance registration may be required.

How to count participation at a lecture/forum/classroom activity:

While standing at the entrance, use to clicker to record the number of visitors who enter the lecture/forum activity over the course of the entire program (we will assign specific programs to count).

Count every participant who is at least 3 years old. If people are allowed to enter after the program starts, continue to count them as long as they see at least 5 minutes of the activity.

At the end of the program, record the official count on the reporting form.





**Exhibit/ Graphic display/ Computer activity: Use the Clicker Method**

This is a stand-alone, unfacilitated experience, typically in a gallery.

How to count participation at an exhibit/graphic display/computer activity:

Stand in a location where it is easy to see who enters the gallery and whether the visitors engage with the exhibits. If there is more than one entrance, monitor the entrance through which visitors are more likely to enter.

Using the clicker, record the number of visitors who engage with the exhibit over the course of an hour (we will assign specific hour(s) for counting).

Count every participant who is at least 3 years old who enters the gallery and touches one of the exhibits or pays attention to it for 5 seconds or more.

At the end of the hour, record the official count on the reporting form.

## Counting Exhibits/Graphic Displays/ Computer Activities: Clicker

- Stand in a location where it is easy to see who enters the gallery and whether the visitors engage with the exhibits. If there is more than one entrance, monitor the entrance through which visitors are more likely to enter.
- Using the clicker, record the number of visitors who engage with the exhibit over the course of an hour.
- Count every participant who is at least 3 years old who enters the gallery and touches one of the exhibits or pays attention to it for 5 seconds or more.
- At the end of the hour, record the official count on the reporting form.



### **Exhibit/ Graphic display/ Computer activity: Use the Clicker Method**

This is a stand-alone, unfacilitated experience, typically in a gallery.

How to count participation at an exhibit/graphic display/computer activity:

Stand in a location where it is easy to see who enters the gallery and whether the visitors engage with the exhibits. If there is more than one entrance, monitor the entrance through which visitors are more likely to enter.

Using the clicker, record the number of visitors who engage with the exhibit over the course of an hour (we will assign specific hour(s) for counting).

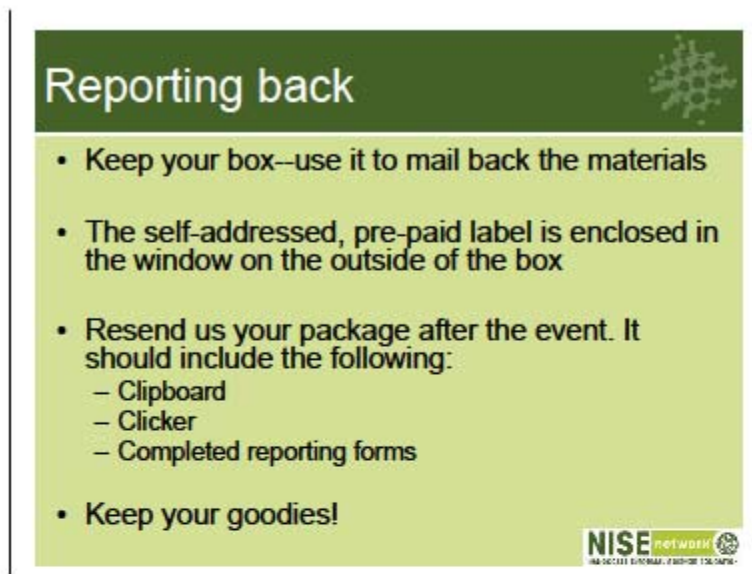
Count every participant who is at least 3 years old who enters the gallery and touches one of the exhibits or pays attention to it for 5 seconds or more.

At the end of the hour, record the official count on the reporting form.

## Your Counting Assignment

- It is important that you count participation at the activities assigned to you.
- If you cannot count participants during the assigned time, let us know and we can work out an alternative schedule together.
- Looking to find more of the following to count:
  - Stand-alone exhibits
  - Lectures
  - Stage presentations/theater
  - Forums



A slide titled "Reporting back" with a green header and a light green body. It contains a bulleted list of instructions for returning materials. The NISE network logo is in the bottom right corner.

## Reporting back

- Keep your box--use it to mail back the materials
- The self-addressed, pre-paid label is enclosed in the window on the outside of the box
- Resend us your package after the event. It should include the following:
  - Clipboard
  - Clicker
  - Completed reporting forms
- Keep your goodies!

**NISE network**  
NANOSCIENCE EDUCATION RESEARCH AND EVALUATION

When your event is over and your reports are filled out, all you need to do is resend our box using the enclosed self-addressed, pre-paid package label. If at all possible, please return your materials within one week of your last NanoDays event, and no later than April 15th. When you send us the box, please make sure it includes the following:

Clipboard

Clicker

All completed reporting forms

You can keep any extra giveaways that you do not use.

## Thank you!!!



- Thank you, thank you, thank you for all of your hard work!
- Questions/comments?
  - Juli Goss, [jgoss@mos.org](mailto:jgoss@mos.org), 617 589 4413
  - Christine Reich, [creich@mos.org](mailto:creich@mos.org), 617 589 0302



## **Appendix E: Participating institutions**

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### **Participating Institutions**

**University of Maryland, MRSEC**

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**California Polytechnic State University**

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**University of California, Santa Barbara**

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**Children’s Museum of Science and Technology**

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**DaVinci Science Center**

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**Discovery Center of Idaho**

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**The Franklin Institute**

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**Gulf Coast Exploreum Science Center**

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**Milton J. Rubenstein  
Museum of Science and Technology**

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**Museum of Science, Boston**

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**National Museum of American History**

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**Norfolk State University and  
Children’s Museum of Virginia**

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**Oregon Museum of Science and Industry**

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**Pink Palace Museums**

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**Science Museum of Minnesota**

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**Sciencenter**