

SCIENCE AND TECHNOLOGY EXHIBITION

Cluster Level Science and Technology Exhibition-2017

The science and technology exhibition at the regional/cluster level is scheduled on **22nd April 2017** in four venues with the theme “Science for Peace and Development.” The three best exhibits from each region shall participate at the National STEM Olympiad-2017 at Thimphu.

What is Science Exhibition?

The science exhibition is one of the ways in which children from different age groups involve themselves in creating science projects that will develop their interacting skills, speaking skills, problem solving skills, creativity. The science exhibition is a forum, wherein students get opportunity to do or create the practical aspects of science concepts learned in science classroom with amazing experiences that are truly innovative, exciting, and engaging. It encourages and inculcates scientific temper among the children.

Science exhibition serves as a platform where students showcase their talents in Science, Technology, Engineering and Mathematics (STEM) and their applications in different areas related with our everyday life.

Aims and objectives:

- i. To generate excitement about science and its possibilities.
- ii. To help children to relate and apply the scientific concepts to their day to day lives.
- iii. To apply STEM to visualize and solve problems pertaining to everyday life.
- iv. To create awareness about environmental issues and concerns and inspiring children to devise innovative ideas towards their mitigation.
- v. To understand science through hands on experiences.
- vi. To provide knowledge enhancement for science teachers.
- vii. To demonstrate the range of science and technology based careers available in and out of Bhutan
- viii. To understand the importance of science for the wellbeing of the society and the environment.

2. Learning Experiences:

Students will have the opportunities to:

- i. Design and make scientific experiments and devices relevant to science learning and application in day-to-day lives of learners.
- ii. Conduct research, observe phenomena and manipulate objects to facilitate their science study to solve problems to enhance their scientific knowledge and understanding.
- iii. Work independently or in groups to organize, analyze and synthesize the information gained from the first hand experiences from various sources of information to validate and make their information reliable.
- iv. Prepare reports of the experiment or projects and use various means of communicating their ideas.

3. Learning Outcomes:

These experiences facilitate students to:

- i. Be able to relate the scientific concepts to the phenomena around learners' environment.
- ii. Use scientific concepts, principles, laws and processes to solve problems.
- iii. Narrate the importance of science and technology and use and manage materials and energy resources in sustainable manner for the wellbeing of the society and the environment.
- iv. Design research to solve problems and to enhance their understanding and knowledge of science and technology.
- v. Acquire the qualities of commitment, self-confidence, tolerance, curiosity and integrity in doing science.
- vi. Be more creative, innovative and critical.

B: Programs and Activities

1. Organization:

- i. The Science and Technology Exhibition for the year 2017 is organized in **FOUR clusters**. Cluster level competition will be **coordinated by the Dzongkhag/Thomdey Education Officers** delegated based on the location of the venue of the exhibitions.
- ii. All the Middle and Higher Secondary schools are expected to participate in this program. The **three best exhibits** from each cluster shall participate at the National STEM Olympiad- 2017 at Thimphu.
- ii. The Cluster Coordinators shall make arrangement for the lodge and food for the participants.
- iii. The expenses for the meals and refreshments for the students during travels are to be managed from the **DSA allocated at the rate of Nu 250.00 for each student per day**.
- iv. The certificates and the **fund estimated for each region will be released to the concerned region coordinators (DEOs and TEOs) two weeks** before the exhibition day.
- v. Each region is allocated **fund estimated based on the number of participants to cater lunch** for all the participants and the invited guest and Judges on the exhibition day.
- iii. The participating schools will arrange their transport.
- iv. The contingency fund of maximum of **Nu 2000.00 is allocated to each participating school** for the procurement of raw materials to prepare exhibits. The expenditure incurred by the school in the procurement of raw materials to prepare exhibits is to be reimbursed upon submission of bills to the cluster coordinator.
- v. A sum of **Nu 5,000.00 is allocated for each cluster** for preparation of the exhibition venue.
- vi. Each participating school will select ONE best exhibit, which will be represented by **FOUR** students (emphasis on equal participation between boys and girls) with ONE Escort teacher.
- vii. The expenses for the participants from other agencies may be adjusted from the respective agencies.

2. Entry of the exhibits:

- i. The entry must be of good finish and of MSS & HSS standard.
- ii. The competing school must submit **a detailed write-up of the exhibit**, both in soft and hard copies, with illustrations and photographs to the regional coordinator.
- iii. A panel of judges, from science related profession, must evaluate the entries of all the participating schools.
- iv. The three best entries, first, second and third, shall be determined based on the point scored by the entries. These three entries will participate at National STEM Olympiad.
- v. The best three entries will be awarded a cash prizes of:

a.	First	Nu 15,000.00
b.	Second	Nu 10,000.00
c.	Third	Nu 7,000.00

- vi. The prizes received must be used for promotion of science education programmes in the school and report sent to STEM Division, REC, Paro.
- vii. A maximum of 6 students must participate to develop an entry. All the student participants of the will be awarded certificate of participation (total of maximum 6 certificates).

3. The Exhibits:

The exhibit should be constructed in strict adherence to the following criteria:

- i. A working or still model or device to explain scientific concepts, principles or processes that contributes towards fostering peace and development in the society.
- ii. An indigenous design of a machine or device that is environmentally sustainable.
- iii. An innovative and inexpensive design or technique, which has improved the life of rural community.
- iv. Interactive scientific tools that facilitate science learning in the classroom.

Greater emphasis may be given to **investigation based innovative projects** to kindle curiosity, originality and creativity in students.

4. Evaluation of exhibits:

Only one entry from each school will be judged. The exhibits will be **evaluated or judged** by the panel of judges as per the **criteria and rubrics given below**:

Si no	Criteria	Score			
		4	3	2	1
1	Relevance to the Theme of the Science Exhibition	The entry exhibits strong relevance to the theme of the science exhibition	The entry exhibits some relevance to the theme of the science exhibition	The entry exhibits weak relevance to the theme of the science exhibition	The entry exhibits no relevance to the theme of the science exhibition
2	Creativity and Innovation	Entry exhibits complex, original and innovative works that is based on scientific concepts and theories.	Entry exhibits simple, adapted and innovative works that is based on scientific concepts and theories.	Entry exhibits simple, adapted and replicated works that is based on scientific concepts and theories.	Entry exhibits reproduction works without innovation
3	Scientific Thought/Principle /Approach	A great deal of diverse and latest and scientific ideas, principles, concepts and thoughts are put into entry exhibits	A good deal of diverse and latest scientific ideas, principles, concepts and thought are put into entry exhibits	A limited scientific ideas, principles, concepts and thought are put into entry exhibits	A single or no scientific ideas, principles, concepts and thought are put into entry exhibits
4	Technical skill /workmanship	Exhibits displays required scientific skill, procedures and precautions, and products have good finish and is evident that the work is done and produced by students	Exhibits displays some scientific skill, procedures and precautions, and products have rough finish and is evident that the work is done and produced by students	Exhibits displays minimum scientific skill, procedures and precautions, and products have good finish and is not evident that the work is done and produced by students	Exhibits displays little or no scientific skill, procedures and precautions, and products have rough finish and is not evident that the work is done and produced by students
5	Documentation	Detailed original write-ups with all the components (principles used, materials, procedures, working, illustrations, photographs etc.) are displayed and submitted (hard and soft copy) for each entry during the exhibition	Extracted or compiled write-ups with all the components (principles used, materials, procedures, working, illustrations, photographs etc.) are displayed and submitted (hard and soft copy) for each entry during the exhibition	Extracted or compiled write-ups without all the components (principles used, materials, procedures, working, etc.) are displayed and submitted (hard copy only) for each entry during the exhibition	No write-ups are displayed and submitted (hard and soft copy) for each entry during the exhibition
6	Indigenous and Inexpensive	Entry has strong local context, made by using materials available locally, portable, and can be cheaply reproduced.	Entry has some relevance to the local context, made by using the locally available materials, and can be cheaply reproduced.	Entry has very less relevance to the local context, made by using commercial materials, and difficult to reproduce.	Entry has no relevance to the local context, made by using commercial materials, and expensive to reproduce.

7	Educational and Utility value	Exhibits showcases practical utility in daily lives and can also be used in science classes for teaching and learning scientific concepts	Exhibits showcases practical utility in daily lives and but cannot be used in science classes for teaching and learning scientific concepts	Exhibits showcases conditional practical utility in daily lives and but cannot be used in science classes for teaching and learning scientific concepts	Exhibits showcases unwanted and impractical utility in daily lives and but cannot be used in science classes for teaching and learning scientific concepts
8	Presentation-Explanation and demonstration	Exhibit is supported by ample charts along with good explanation and demonstration by the student representative. The model is supplemented by manuals and model works.	Exhibit is supported by charts along with fair explanation and demonstration by the student representative. The model is not supplemented by manuals and model works.	Exhibit is supported by a few charts along with poor explanation and demonstration by the student representative. The model is not supplemented by manuals and model works.	Exhibit is supported by limited charts along with very poor explanation and demonstration by the student representative. The model is not supplemented by manuals and model does not work.

The ranking of the schools to win the prizes is determined by the total points scored of the entry from each school. The panel of judges and regional coordinator must convene a meeting (before exhibition) to discuss the strategies of evaluation and to clarify the marking scheme of the exhibits.

C: Terms of Reference for various coordinators:

1. Coordinator (concerned DEOs & TEOs)

The Regional Level Coordinator shall:

- i. Convene a meeting with panel of Judges, a day before the exhibition to discuss the strategies of evaluation and to clarify the marking scheme of the exhibits. The minutes of the meeting and clearly stated strategy of marking must be submitted along with the report to STEM Division, REC, Paro.
- ii. Arrange logistics for the participating schools such as lodge, food and refreshment.
- iii. Set up and arrange venue for the exhibition and exhibition stalls.
- iv. Carry out chadrig, banner preparation and guest invitation.
- v. Appoint three judges (evaluators) from the science related profession from local organisation and agencies. Ensure that judges are no affiliated in any way to any participating school.
- vi. Invite both print and visual media to cover up the exhibition.
- vii. Invite all the relevant agencies to participate in the exhibition to showcase their products and activities to sensitize the general public and to add variety to the exhibitions. However, their **exhibits are not to be judged.**
- viii. Explore ways of bringing students from nearby schools. However, expenditure for the visiting schools will be borne by the respective school or Dzongkhag.
- ix. Submit the accounts of the exhibitions to the STEM Division, REC, Paro, no later than **29th April 2017**. The submission must abide by the existing financial rules and regulations.
- x. Ensure TDS of 2% is accounted for all the expenditure and bills/cash memos.
- xi. Ensure that the exhibition is conducted with utmost integrity, efficiency and quality.
- xii. Ensure safety at the time of exhibition and maintain discipline amongst the participating school students

- xiii. Submit the write-ups for every exhibit of all participating schools including the attendance list.
- xiv. The results of the Exhibition must be **double checked** prior to declaration of winners.
- xv. Submit a report on the conduct of exhibitions in their respective regions as per the format given below:

A: Reporting Format:

Report

a. General Information

Exhibition date:

Venue:

No of participating schools with students (Attach the list):

Name of participants from other agencies (if any):

b. Brief Introduction:

c. Description of the exhibition: (could mention the exhibition type by each of the participating school with visual evidences)

d. Outcomes:

e. Issues and challenges:

f. Conclusion:

**Name & Signature of the
Regional Coordinator**

Date of reporting:

2. Judges

- i. Convene a meeting with the regional Coordinator (**before exhibition day**) to discuss and finalise the strategies of evaluation and to clarify the marking scheme of the exhibits.
- ii. Ensure that the exhibits are assessed with utmost integrity, efficiency and quality using the criteria and strategies.
- iii. All** the entries must be evaluated by every judge using the criteria and rubric.
- iv. The points awarded for each entry must be clear, signed if overwritten, and summed correctly.
- v. Ensure that the exhibits are purely the work of students and are based on the theme of the exhibition.
- vi. Judges have rights to disqualify and not evaluate any entry if it bears enough evidence that it was exhibited by the school during previous year's exhibition or is not constructed by students.

3. Participating school

The participating school shall:

- i. Familiarize students with all the requirements of Science and Technology Exhibition 2017 and also the criteria and rubrics for the evaluation of exhibits.
- ii. Conduct schools based science exhibitions to select the best exhibit for entry to the regional level science and Technology exhibitions. Please note that old entries are not entertained and may be disqualified.
- iii. Entries must be prepared by students themselves and teachers role is only to guide the students. Enough evidences (like photographs) must be provided, if demanded by judges to confirm that work is done by students.
- iv. Each school is allowed to exhibit ONE entry.
- v. Encourage participating students to work on the exhibits based on the exhibit areas cited above or the areas that have great influence on the lives of people.
- vi. Provide support for students with resources and time for the preparation of exhibits.
- vii. Arrange transport to reach the participants to the Cluster Level Science and Technology Exhibition. If the school is selected to participate at the National Level the parent school should arrange the transportation.
- viii. Depute FOUR students with an escort teacher to lead students to the exhibitions.
- ix. The participating school and the participants must complete the Registration Form and Consent Form for participation at the respective regional centers.
- x. Make the participating students to prepare a detailed write-up of the exhibits for submission to the regional coordinator, both in soft and hard copies.
- xi. Ensure safety while preparing the exhibits and at the time of exhibitions.
- xii. Maintain discipline and decorum when in the exhibition venue.

For further information, please contact the following:

Program Coordinator

Mr. Karma Tenzin

Training Developer

Email: karmatenzin@rec.org.bt

Mobile: 17903848

Mr. Wangpo Tenzin

DEAN, Curriculum Development Centre

Email: wtenzindcrd@yahoo.com

Mr. Bhoj Raj Rai

Chief, STEM Division

Curriculum Development Centre

Email: bhoj70@yahoo.com

Mr. Surjay Lepcha

Curriculum Developer

Curriculum Development Centre

Email: surjaylepcha@gmail.com

Toll Free: 185

Cluster Level Science and Technology Exhibition-2017

Fund estimation for each cluster:

Cluster 1 Venue: Khasadrapchu MSS, Thimphu							
Sl. No	School	No. of students	Rate	No. of days	DSA for Students	Contingency	Total
1	Yangchenphug HSS	4	250	2	2000	2000	4000
2	Motithang HSS	4	250	2	2000	2000	4000
3	Nima HSS (Pvt)	4	250	2	2000	2000	4000
4	Pelkhil HSS (Pvt)	4	250	2	2000	2000	4000
5	Lungtenzampa MSS	4	250	2	2000	2000	4000
6	Changangkha MSS	4	250	2	2000	2000	4000
7	Dechenchoeling MSS	4	250	2	2000	2000	4000
8	Babesa MSS	4	250	2	2000	2000	4000
9	Dr Tobgyel MSS	4	250	2	2000	2000	4000
10	Druk MSS	4	250	2	2000	2000	4000
11	Loseling MSS	4	250	2	2000	2000	4000
12	Khasadrapchu MSS	4	250	2	2000	2000	4000
13	Kuzugchen MSS	4	250	2	2000	2000	4000
14	Drugyel HSS, Paro	4	250	3	3000	2000	5000
15	Shari HSS, Paro	4	250	3	3000	2000	5000
16	Utpal HSS	4	250	3	3000	2000	5000
17	Kuenga HSS	4	250	3	3000	2000	5000
18	Lango MSS, Paro	4	250	3	3000	2000	5000
19	Khangkhu MSS, Paro	4	250	3	3000	2000	5000
20	Shaba MSS, Paro	4	250	3	3000	2000	5000
21	Bitekha MSS, Paro	4	250	3	3000	2000	5000
22	Zilukha MSS, Thimphu	4	250	2	2000	2000	4000
23	Wangbama CS	4	250	2	2000	2000	4000
24	Chapcha MSS	4	250	3	3000	2000	5000
25	Chukha CS	4	250	3	3000	2000	5000
26	Gogzim UDHSS	4	250	3	3000	2000	5000
27	Chundu CS	4	250	3	3000	2000	5000
28	Jampel HSS	4	250	3	3000	2000	5000

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First Prize	15000
Runners Up	10000
Second Runners Up	7000
Refreshment	20000
Lunch (112 + 45) * 300r	47100
Chadre and Banner	5000
Total	229100

Cluster 2 Venue: Mendrelgang CS, Tsirang							
Sl. No	School	No. of students	Rate	No. of days	DSA for Students	Contin gency	Total
1	Damphu HSS, Tsirang	4	250	3	3000	2000	5000
2	Daga HSS, Dagana	4	250	3	3000	2000	5000
3	Geserling MSS	4	250	3	3000	2000	5000
4	Dagapela MSS, Dagana	4	250	3	3000	2000	5000
5	Drujeygang HSS, Dagana	4	250	3	3000	2000	5000
6	Lhamoizhingkha MSS, Dagana	4	250	2	2000	2000	4000
7	Samtse HSS, Samtse	4	250	3	3000	2000	5000
8	Tendu HSS, Samtse	4	250	3	3000	2000	5000
9	Phuentsholing HSS, Chukha	4	250	3	3000	2000	5000
10	Yoeseltse MSS, Samtse	4	250	3	3000	2000	5000
11	Gomtu MSS, Samtse	4	250	3	3000	2000	5000
12	Peljorling HSS, Samtse	4	250	3	3000	2000	5000
13	Dorokha MSS, Samtse	4	250	3	3000	2000	5000
14	Phuentsholing MSS, Chukha	4	250	3	3000	2000	5000
15	Wangchu MSS, Chukha	4	250	3	3000	2000	5000
16	Darla MSS, Chukha	4	250	5	5000	2000	7000
17	Pakshikha MSS, Chukha	4	250	4	4000	2000	6000
18	Chumithang MSS	4	250	5	5000	2000	7000
19	Sonamgang MSS	4	250	5	5000	2000	7000
20	Gedu HSS, Chukha	4	250	5	5000	2000	7000
21	Kamji MSS, Chukha	4	250	5	5000	2000	7000
22	Punakha HSS	4	250	3	3000	2000	5000
23	Ugyen Academy	4	250	3	3000	2000	5000
24	Khuruthang MSS	4	250	3	3000	2000	5000
25	Dechetsemo CS	4	250	3	3000	2000	5000
26	Tashidhingkha MSS	4	250	3	3000	2000	5000
27	Kabesa MSS	4	250	3	3000	2000	5000
28	Thinleygang MSS	4	250	3	3000	2000	5000
29	Sonamthang MSS	4	250	3	3000	2000	5000

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First	15000
Second	10000
Third	7000
Lunch (116+45) *300r	48300
Chadre & Banner	5000
Refreshment	20000
Total	260300

Cluster 3 Venue: Jakar HSS, Bumthang							
Sl. No	School	No. of students	Rate	No. of days	DSA Total	Contingency	Total
1	Jakar HSS, Bumthang	4	250	2	2000	2000	4000
2	Phobjikha MSS, Wangdue	4	250	3	3000	2000	5000
3	Sherubling HSS, Trongsa	4	250	3	3000	2000	5000
4	Zhemgang HSS, Zhemgang	4	250	3	3000	2000	5000
5	Tang MSS, Bumthang	4	250	3	3000	2000	5000
6	Chumey MSS, Bumthang	4	250	3	3000	2000	5000
7	Ura MSS, Bumthang	4	250	3	3000	2000	5000
8	Taktse MSS, Trongsa	4	250	3	3000	2000	5000
9	Yebilaptsa MSS, Zhemgang	4	250	3	3000	2000	5000
10	Buli MSS, Zhemgang	4	250	3	3000	2000	5000
11	Minjev MSS, Lhuentse	4	250	3	3000	2000	5000
12	Samcholing MSS	4	250	3	3000	2000	5000
13	Tshangkha MSS	4	250	3	3000	2000	5000
14	Lhuentse HSS, Lhuentse	4	250	3	3000	2000	5000
15	Mongar HSS, Mongar	4	250	3	3000	2000	5000
16	Gyelposhing HSS, Mongar	4	250	3	3000	2000	5000
17	Autsho MSS, Lhuentse	4	250	3	3000	2000	5000
18	Tangmachu MSS, Lhuentse	4	250	3	3000	2000	5000
19	Kideykhari MSS	4	250	3	3000	2000	5000
20	Bajo HSS, Wangdue	4	250	3	3000	2000	5000
21	Gaselo HSS, Wangdue	4	250	3	3000	2000	5000
22	Bjishong MSS, Gasa	4	250	3	3000	2000	5000
23	Samtengang MSS, Wangdue	4	250	3	3000	2000	5000
24	Sonam Kuenphen HSS (pvt)	4	250	3	3000	2000	5000
25	Sarpang HSS, Sarpang	4	250	3	3000	2000	5000
26	Gelephu HSS, Sarpang	4	250	3	3000	2000	5000
27	Norbuling MSS, Sarpang	4	250	3	3000	2000	5000
28	Pelrithang MSS, Sarpang	4	250	3	3000	2000	5000

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First	15000
Second	10000
Third	7000
Lunch (112+45) * 300r	47100
Refreshment	20000
chadre and Banner	5000
Total	243100

Cluster 4 venue: Tashitse HSS, Trashigang							
Sl. No	School	No. of students	Rate	No. of days	DSA Total	Contingency	Total
1	Orong HSS, S/jongkhar	4	250	3	3000	2000	5000
2	Nangkor HSS, P/gatshel	4	250	3	3000	2000	5000
3	Nganglam HSS, P/gatshel	4	250	5	5000	2000	7000
4	Rangjung HSS	4	250	3	3000	2000	5000
5	Jigmesherubling HSS	4	250	3	3000	2000	5000
6	Tashitse HSS	4	250	3	3000	2000	5000
7	P/gatshel MSS, P/gatshel	4	250	3	3000	2000	5000
8	S/jongkhar MSS, S/jongkhar	4	250	3	3000	2000	5000
9	Garpawoong MSS, S/jongkhar	4	250	3	3000	2000	5000
10	Jomotsangkhs MSS	4	250	5	5000	2000	7000
11	Phuntshothang MSS,	4	250	3	3000	2000	5000
12	Martshala MSS, S/jongkhar	4	250	5	5000	2000	7000
13	Dungtse MSS	4	250	3	3000	2000	5000
14	Radhi MSS	4	250	3	3000	2000	5000
15	Trashigang MSS	4	250	3	3000	2000	5000
16	Jampheling HSS	4	250	3	3000	2000	5000
17	Gongthung MSS	4	250	3	3000	2000	5000
18	Bartsham MSS	4	250	3	3000	2000	5000
19	Yurung MSS	4	250	3	3000	2000	5000
20	Udzorong MSS	4	250	3	3000	2000	5000
21	Karmaling HSS	4	250	3	3000	2000	5000
22	Bayling HSS, T/yangtse	4	250	3	3000	2000	5000
23	Tshenkharla MSS, T/yangtse	4	250	3	3000	2000	5000
24	Tongmijangsa MSS	4	250	3	3000	2000	5000
25	Ramjar MSS	4	250	3	3000	2000	5000
26	Yadi HSS, Mongar	4	250	3	3000	2000	5000
27	Drametse MSS, Mongar	4	250	3	3000	2000	5000
28	Chaskhar CS, Monggar	4	250	3	3000	2000	5000
29	Yelchen CS, Pemagatshel	4	250	3	3000	2000	5000
30	Dungsam Academy (Pvt)	4	250	3	3000	2000	5000
31	Thrimshing CS	4	250	3	3000	2000	5000

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First	15000
Second	10000
Third	7000
Lunch (112+45)	47100
Refreshment	20000
Chadre & Banner	5000
Total	265100

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Centre:..... Name of the Judge:
..... Signature.....

Sl No.	Title of Exhibit	Name of School	Criteria							Total (32)
			Relevance to the Theme of the Science Exhibition (4)	Creativity and Innovation (4)	Scientific Thought/Principle/Approach (4)	Technical skill / workmanship (4)	Documentation (4)	Characteristics of Exhibits 4)	Educational and Utility value (4)	

* Use pens only for markings

TRAVEL PERMISSION FORM FOR PARTICIPANTS

SCIENCE EXHIBITION-2017

..... **Higher Secondary School**

Name of Participant	Emergency Phone Number	Parent/ Guardian Signature

has my permission to attend in the upcoming Science Exhibition 2015 at..... The
..... (transport) will leave the school at am/pm on(date) and return
to school at am/pm on(date).

FIELD TRIP LIST OF PARTICIPANTS SCIENCE EXHIBITION-2017

..... **Higher/Middle Secondary School**

Date:.....

Name of Escort Teacher:.....

The following students will be participating in the upcoming Science Exhibition 2017 at
The bus (transport) will leave the school at am/pm on(date) and return to
school at am/pm on (date).

List of Participants:

Entry Name
1(R)
2(R)
3
4
5
6

R = Leader(s) who will participate in the event to represent the entry. If you have any concerns please contact:

(Seal and Signature of Principal) Phone:.....