

टीएनएंडएमडी

संदर्भ: टीएनएमडी/ जन / 18

4 जुलाई 2023

विषय: लर्निंग साइंस वाया स्टैन्डर्ड्स- विज्ञान शिक्षकों के प्रशिक्षण के लिए मानक संचालन प्रक्रिया।

भारतीय मानक ब्यूरो के सभी विभागों/ क्षेत्रीय कार्यालयों/ शाखा कार्यालयों/प्रयोगशालाओं से अनुरोध है कि उपरोक्त विषय से सम्बंधित सलग्न प्रपत्र का अनुपालन हेतु अवलोकन करें।

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मुख्यालय के सभी विभागों/ क्षेत्रीय एवं शाखा कार्यालयों/ प्रयोगशालाओं को परिचालित (इंट्रानेट के माध्यम से)

TN&MD

Ref: TNMD/Gen/18

4 July 2023

Subject: Learning Science via Standards – SoP for Training of Science Teachers.

All Department at HQs/Regional Offices/Branch Offices/Labs may kindly see the attached circular on the subject mentioned above for compliance.

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Circulated to all Department at HQs/ROs/BOs/Labs (Through Intranet)

Bureau of Indian Standards

Doc. No.: TNMD/STTP/1, June 2023

Subject: Learning Science via Standards – SoP for Training of Science Teachers

1. Introduction

1.1 Bureau of Indian Standards (BIS) has been mandated to formulate national standards as well as promote use of these standards among various stakeholders. In pursuit of this mandate, academia has been identified as an important stakeholder as the knowledge of quality and standards is of immense value to the students to seamlessly join the quality ecosystem in near future on completion of academic sessions.

1.2 One of the most visible and vibrant engagement with academia is in the form of creation of **Standards Clubs** in schools and colleges across India. These Clubs provide a platform for the students to explore the world of standards for enhancing their knowledge through interactive and competitive means such as quiz and essay writing, poster making and standard-writing competitions. For maintaining interest and striving for ever evolving activities under the Clubs, BIS keeps on introducing newer concepts for empowering the students with informative and educative contents.

1.3 "Learning Science via Standards" is another initiative of BIS which aims to promote scientific knowledge and understanding among students through the concepts of quality and standards. Under this initiative, BIS is developing **Lesson Plans** focusing on its practical applications of scientific laws and principles as demonstrated through commonly used day-to-day products. Due to the very nature of their presentations, these Lesson Plans serve to supplement the knowledge on science subjects taught as part of regular course curriculum.

2. Scope and Purpose

2.1 The training programmes are meant for teachers who are teaching science subjects to students of class 9th to 12th and who are either currently the Mentors of Standards Clubs or are likely to become one.

2.2 Although, the Lesson Plans are self-explanatory, training on methodology of transacting these Lesson Plans would enable the science teachers to enhance their teaching methods and connect theoretical concepts with real-world scenarios and also maximizing the benefits to the students.

2.3 Training programmes are to be conducted by the BIS Regional and Branch Offices (Ros/BOs) at locations closest to the teachers, these guidelines would serve to provide general understanding of good practices to be adopted facilitating adoption a uniform approach.

3. Conducting Training Programme

3.1 **Duration & Mode** - Training programme would be a 2-day residential programme. The coordinating BIS Office would make the stay arrangements either at NITS Hostel or any Govt. Institutions with Hostel Accommodations or any other suitable hotel arrangement in that order, as appropriate. The requirement of 'residential' participation may be relaxed, depending on merit of individual case.

3.2 **No. of Participants** - A Batch size of around 40 participants would be considered appropriate. However, the no. can vary depending upon need and availability.

3.3 **Publicity** - BIS Office should give adequate publicity through different means, as appropriate, for announcing the planned training programme highlighting the benefits of Learning Science via Standard initiatives for students as well as the teaching fraternity.

3.4 Selection of Participants

3.4.1 BIS Offices would invite participation from schools for nominating Science Teachers from amongst those where Standards Clubs are already formed. Participation may also be invited from such schools where there is potential of creation of Science Clubs in near future.

3.4.2 Preference would be given to such teachers who have minimum 2 years' experience of teaching the science subject. In case of large no. of nominations, BIS Office would decide the criteria for selecting the participants which can be accommodated in a particular training programme. The BIS Office may, however, conduct another programme to train the other remaining nominated participants.

3.4.3 The science teachers shall be currently engaged in teaching of science subjects to the students of Class 9th to 12th.

3.5 Training Methodology

3.5.1 **Course Content** - Training is imparted through brief presentations on Overview on BIS activities covering Standardization, Certification Schemes, Testing, Training and Standards Promotion activities with focus on engagement with academia including genesis of Standards Club activities therein. Participants will also be familiarized with features of BIS website, e-BIS, Care App and Manak Rath – the Online Exchange Forum for accessing and using the information related to quality, standards and related subjects. Training will have detailed presentations on 4 to 5 Lesson Plans on identified subjects for elaborating the scientific laws & principles with ample examples from products of day-to-day life and their relationship with quality and standards. The science teachers would be nudged to explore application of more and more scientific principles in a variety of products. This will facilitate assimilation of knowledge by the participants and for developing their own thinking process. This would be further strengthened through group activities under which the participants would attempt identification of scientific laws and principles related to assigned products.

3.5.2 **Training Module** - Suggested training module is given at **Annexure-1**.

3.5.3 **Guidance on conducting training sessions** - Training sessions need to be conducted in a structured manner so as to enhance knowledge, improve performance, and develop competencies for correlating scientific laws and principles with their applications in real world scenario. A suggested approach for conducting various sessions of the training programme is given at **Annexure-2**.

4. Financial Aspects

4.1 **Budget Head** - Expenditure towards conducting training programmes for Science Teachers should be debited under the Budget Head 3102 for Standards Promotion Activity, Sub-head Standards Clubs Activity.

4.2 **Expenditure** - Various types of expenditure and the entitlements are as given below:

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- a) Arrangements for boarding and lodging for the trainee teachers to be made by the RO/BO coordinating the programme. Accommodation arrangement for trainees may be made as per entitlement for Levels 9 to 12 as given under 12 (4)(a) of Bureau of Indian Standards (Terms and Conditions of Service of Employees) Regulations, 2020 i.e., Max. Rs. 4200/- in 'X' class cities and Rs.3300/- in all other cities. Efforts should be made to avail maximum discounts while making the Boarding and Lodging arrangements including the options for twin sharing of rooms wherever feasible and considered appropriate.
 - b) Trainee participants may also be reimbursed travel expenses which shall be restricted to a maximum of AC 2 Tier train fare from the originating station to destination station or any by other admissible mode of travel, on production of original receipt(s) and/or invoice(s). For places not connected by train, reimbursement of bus fare, upto the limit of AC Bus by State Transport to be considered, subject to production of original bill/ticket. Participants shall bear their own expenses for local travels for attending the training.
- 5. Report and Follow-up** – After the conduct of the training programme, the coordinating RO/BO should do the following:
- a) Feedback on the programme to be obtained from the participants on content, duration, presentation and lodging & boarding arrangements.
 - b) Feedback to be analysed for identification of areas of improvement in training programme
 - c) Report of conduct of training shall be uploaded on BIS portal and a copy alongwith photographs and videos shall be forwarded to TNMD.

2-Day Training Programme on Learning Science via Standards for Science Teachers

Dates :

Venue :

Programme Schedule

Day 1			
Session	Time (h)	Session Activity	Faculty
	0900 - 0930	Registration	
1	0930 - 1000	Inauguration (Welcome, Programme Objectives and Inaugural Address)	
2	1000 - 1030	Overview of BIS Activities covering Standardization, Certification Schemes, Testing, Training & Standards Promotion BIS website and e-BIS – Features and Use Participants to download BIS Care App on their Mobiles	
3	1030 - 1100	Standards Promotion activities and engagement with Academia - Genesis of Standards Club & its activities and Orientation Film	
	1100 - 1115	Tea	
4	1115 - 1145	Significance of Science in day-to-day life and its relation to Quality and Standards Role of Science Teachers in Promoting Quality & Standards	
5	1145 - 1215	Learning Science Via Standards – Concept and Methodology of Use	
6	1215 - 1330	Transacting Lesson Plan – Product 1*	
	1330 - 1400	Lunch	
7	1400 - 1500	Transacting Lesson Plan – Product 2 *	
8	1500 - 1600	Group Activity on Identification of Scientific Laws and Principles related to products in daily life	
	1600 - 1615	Tea	
9	1615 - 1715	Presentation by Participants on the Group Activity	
10	1715 - 1730	Discussion on day's sessions and preparation for Laboratory visit	
Day 2			
11	0930 - 1230	Visit to Laboratory for demonstration of testing and scientific laws and principles in action as related to Lesson Plans	
	1230 – 1400	Transit to Venue and Lunch	
12	1400 - 1500	Transacting Lesson Plan - Product 3 *	
13	1500 - 1600	Transacting Lesson Plan - Product 4 *	
	1600 - 1615	Tea	
14	1615 - 1715	Workshop	
15	1715 - 1745	Feedback & Summing up	

* Suggested Products : Domestic L P Gas Stove, Caustic Soda, Cement, Geyser

Annexure-2

EXPLANATION OF THE KEY COMPONENTS OF TRAINING MODULE SESSIONS

Session	Activity	Guidance
1	Registration	Participants to register and provide details such as Email, Mobile No., Designation, Standard Club & Mentor Id (if available), Qualification, Subject(s) taught, Class (es) taught, Experience (in no. of completed years)
1	Inauguration (Welcome, Programme Objectives and Inaugural Address)	It should be a formal inauguration with welcome address, programme objectives and inaugural address. Chief Guest may be invited from outside or DDGR or Head of the BO depending upon their availability. Allow participants to introduce themselves, sharing their background and teaching experience.
2	Overview of BIS Activities BIS website and e-BIS – Features and Use Exchange Forum BIS Care App	A brief presentation on Overview of BIS activities, including Standardization, Certification Schemes, Training, standards promotion and importance of testing, training Highlight recent initiatives of BIS including Exchange Forum. Familiarize participants with the features and usage of the BIS website and e-BIS platform. Participants may be encouraged to download the BIS Care App.
3	Standards Promotion activities and engagement with Academia - Genesis of Standards Club & its activities and Orientation Film	Overview of Standards Promotion Activities of NIS Genesis of Standards Clubs and activities therein Film on Orientation Programme for Standards Clubs to be played in Play-Pause-Proceed manner explaining the teachers how to use for orientation of Standards Clubs members.
4	Significance of Science and Role of Science Teachers in Promoting Quality & Standards	Emphasize the importance of science in daily life and its connection to quality standards through a variety of simple examples in an interactive manner with the participants. Also highlight the pivotal role of science teachers in nurturing scientific temperament among young minds.

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5	Learning Science Via Standards – Concept and Methodology of Use	<p>Explain the concept and methodology of learning science via standards. Discuss how Lesson Plans developed to facilitate practical application-based learning.</p> <p>Elaborate as to how scientific laws and principles govern the characteristics of products.</p> <p>Discuss the pivotal role of science in fostering an understanding of quality and standards among students.</p> <p>Inculcating the concepts quality & standards and relate them to the subjects taught in the regular academic classes.</p> <p>Create inquisitiveness for nurturing scientific temperament among young learners.</p>
6, 7, 12, 13	Transacting Lesson Plans (4 to 5 Product)	<p>Keep all the Lesson Plans download from BIS website or Classroom feature of Exchange Forum.</p> <p>Select 4 to 5 Lesson Plans on different subject, covering chemical, mechanical, electrical, civil etc. products.</p> <p>Different Lessons Plan should presented by different officers, to the extent possible. In any case, all the Lesson Plans should not be presented by the same faculty. Faculty should familiarize themselves with various aspects related to the product such as nature and use, general manufacturing process, materials and components, characteristics, including performance parameters etc.</p> <p>Conduct a detailed walkthrough of the Lesson Plan on the identified subjects.</p> <p>Explain the scientific concepts, laws, and principles associated with the product, its characteristics and methods of tests.</p> <p>Encourage the participants to suggest more scientific laws and principles related to the product.</p>
8	Group Activity	<p>Participants to be divided into different Groups keeping in view their discipline and nature of the product assigned, to the extent possible. Each Group should not be of more than 5 trainees.</p> <p>Assign subject related to product used in day-to-day life to each Group with task of identifying scientific laws and principles. Encourage group discussions and collaboration.</p>

		<p>It would be desirable that faculty/officers/GETs are associated with the Group to facilitate discussion target towards identification of scientific laws and principles for meaningful outcome.</p> <p>Groups to relate the identified scientific laws and principles to all/any of the aspect related to the product such as design, manufacturing processes, characteristics, nature of materials used etc.</p>
9	Presentation by Participants on the Group Activity	<p>Each Group to select their leader for presentation of their findings, in PPT form and elaborating the identified scientific laws and principles. Encourage participants to share their insights and how the identification and correlation was arrived at.</p> <p>Encourage the other Group members to comment on the presentation.</p>
11	Visit to Laboratory for demonstration of testing and scientific laws and principles in action as related to Lesson Plans	<p>Organize a visit to BIS/Outside Laboratory to provide participants with practical exposure to testing and quality control procedures. The technical personnel of the laboratory may also present the various features of testing of product characterises, if feasible. Participant should be shown demonstration of testing for visualizing the scientific laws and principles in action as related to product testing.</p>
14	Workshop	<p>Means of Workshop could be decided by the RO/BO depending upon availability of time and logistic suitability. Option could be Quiz comprising of 20 questions. Otherwise, participants could also be actively engaged on matters relating scientific laws and concepts or even sharing their experiences in classrooms while teaching or daily-life experiences. Purpose should be to gauge their understanding of relationship between scientific laws and principles to the activities happening all around.</p>
15	Feedback & Summing up	<p>Collect feedback from participants regarding the training programme content, duration, presentation and lodging & boarding arrangements.</p> <p>Acknowledge and appreciate their participation.</p> <p>Conclude the training programme by summarizing key takeaways and emphasizing the importance of implementing the acquired knowledge in their classrooms.</p>