

Teacher-in-Residence (TIR) Field Manual

By Jon Anderson, TIR Coordinator

June 2020

A. For Site Leaders

1: Introduction and Purpose:

This section is aimed primarily at Site Leader(s) that are either considering applying for PhysTEC funding or have recently received funding, or who are considering hiring a TIR without PhysTEC funding. Specifically, this document addresses the Teacher-in-Residence (TIR) component of a physics teacher education program. PhysTEC has identified the TIR as the linchpin of most successful teacher preparation programs and as someone that is instrumental in the recruiting, educating, and supporting of teachers of physics. The TIR is involved in nearly every aspect of the teacher preparation program, and funding this critical position is one of the crucial challenges that institutions face in building a successful program. Drawing on the experiences of the numerous sites that have previously been funded by PhysTEC, the steps outlined below have shown to be successful approaches to implementing the TIR position.

2: Identify TIR candidates from the local physics teacher community

If possible, identify teachers that already have a connection of some sort to the site's physics department. These teachers could be graduates of the institution, connected through some type of outreach conducted by the department, associated with other programs facilitated by the university (RET, QuarkNet, Modeling Instruction, College-in-the-Schools, student teaching practicums, etc.), or part of a larger area physics teacher's organization, to name a few.

3: Determine the most appropriate TIR model for your site

PhysTEC sites have utilized a variety of TIR models throughout the history of the project. The different models that are described below have been developed to best suit the needs of the site. Factors such as local demographics, geographic location of the site, student population of the site, and availability of local teachers to work as TIRs are all factors in determining the best type of TIR for the institution.

- **Full-time TIR:** This is the most common model. This is typically a local teacher that is willing and able to leave their school for one or two years to serve in this role.
- **Part-time TIR:** Several sites have hired TIRs on a part-time basis. The time commitments of these TIRs has ranged from a few (~5) hours per week to 20+ hours per week. These have generally been local teachers who continue to teach part-time in their school as well as work in the TIR position.
- **Multiple TIRs:** Some sites have hired from 2 – 4 TIRs to share the duties of the position. These have generally been local teachers who continue to teach full or part-time in their

school as well as work part-time in the TIR position. Each TIR has specific duties and they meet on a regular basis with each other and a site leader.

- Retired Teacher TIR: Retired physics teachers have worked as TIRs in time commitments ranging from very part-time to full-time plus.

4: Begin discussions with TIR candidate's school district

When considering the conversations that will occur between PhysTEC site leaders and the home school district of the potential TIR, here is some history of previous district/site arrangements and some potential talking points.

- Some school districts have put the teacher working as the TIR into the "Teacher on Special Assignment (TOSA)" category, which usually preserves the teacher's seniority level and benefits.
- Some school districts have considered the teacher to be "seconded" to the university for the academic year, i.e. the university pays the teacher's district (often quarterly) and the district continues to pay the teacher as they normally would. By doing this, there is no impact on the teacher's years of service, benefits, state retirement fund (if applicable), or placement on the salary schedule.
- A district benefits in multiple ways:
 - The teacher hired to replace the TIR
 - brings fresh energy and ideas to the school.
 - has connections to a larger teaching community.
 - may have connections to a local teacher preparation program.
 - earns a smaller salary.
 - if the district is paid quarterly, they can invest this difference in salary between replacement teacher and TIR and earn interest on the investment.
 - After returning to their home district, the TIR
 - has fresh energy and ideas.
 - has made a different set of connections to the larger physics teaching community and brings these back.
 - has become more knowledgeable of physics education research (PER) and brings this knowledge back.
 - returns with good connections to the university and its physics and education departments.

There really is no risk to the district, only benefits. When designing the "PhysTEC at [*your institution*]" webpage on the PhysTEC site, it's important to include a short bio of the TIR with a link to his/her school district webpage. It's good PR for the district and something that can be mentioned in conversation with the district administration.

5: Integrate the TIR into the physics department

It is important that the TIR's role in the physics department is clearly articulated to the department and that this is done very early in the TIR's tenure. The TIR should be

- introduced to the department at a department meeting.
- provided an office and phone number.
- assigned an institutional email address.
- given access to the building, classroom(s), lab(s) as needed.
- provided with a copy code for ease of making copies.
- issued an institutional ID.
- provided business cards
- introduced to the “right people” in the department.
 - Department chair
 - Department secretary
 - Lab coordinator
 - Demo coordinator/facilitator

6: Communicate

Regular communication between the site leader(s) and the TIR(s) has been a key component in establishing a successful program at PhysTEC sites. The TIR brings knowledge of local schools and their needs. Site leaders bring knowledge of the institution and the preparation of future physics teachers. Regular communication facilitates the combination of these knowledge bases.

7: Get to work!

TIRs serve in many different roles in teacher preparation programs at PhysTEC supported sites. Their level of involvement depends upon a number of factors including the site at which they are employed, the type of program at the site, and their own background. Listed below are the typical roles in which TIRs often serve and a short description of each role. It should be noted that the time that the TIR spends in each of these roles varies considerably depending upon the institution, the time in the semester, i.e. beginning, middle, or end, and how well the site is established.

In addition to reviewing the list below, it is recommended that site teams take the time to brainstorm possible ways a TIR could be involved in the program and its improvement.

- a. *Recruiter*: Discuss the nature of the teaching profession with students and faculty, including its rewards and challenges, and promote it as a viable career option. Modify and use the resources of the [Get the Facts Out](#) project.

- b. *Advisor*: Engage future teachers in one-on-one interactions and track the progress of students over time, providing individualized attention and support.
- c. *Instructor*: Teach or co-teach methods or content courses, bringing practical insights from the classroom and providing a stronger physics emphasis to general science methods classes.
- d. *Course and curriculum developer*: Improve laboratory, content and methods courses with insights from the classroom.
- e. *LA/TA leader*: Develop the teaching skills of Learning Assistants (LAs) and Teaching Assistants (TAs), by individual interactions or by teaching a pedagogy course; take on administrative tasks in organizing LA or TA training programs.
- f. *Mentor*: Provide critical mentoring support for future and new teachers; serve as a university supervisor for student teachers.
- g. *Professional Community Leader*: Bring together prospective and practicing teachers to meet and communicate on a regular basis.
- h. *Program Coordinator or Team Member*: Take on responsibilities for the teacher education program that faculty cannot, due to lack of time or experience; improve a program by identifying elements that are missing and then developing strategic solutions.
- i. *Professional Development Provider*: Design and deliver workshops to support local teachers, and develop demonstration shows to excite and teach school children about physics.
- j. *Ambassador to School of Education*: Build stronger ties between physics departments and schools of education, for example, through discussions or joint meetings.
- k. *Ambassador to School Districts*: Build relationships with local teachers and districts, for example, through placements or exchanges of teaching ideas.

B. PTEPA and the TIR Role

The [Physics Teacher Education Program Analysis \(PTEPA\) Rubric](#) was developed to characterize the practices and structures observed at thriving PTE programs, providing a guide for program leaders to reflect upon and improve their programs, and enable measurement and research over time.

Every program has some gaps on the rubric; many of them could be filled by hiring a TIR and assigning them appropriate responsibilities. Below is a list of items from the PTEPA Rubric that indicate where a TIR could be of particular benefit for a program to strategically fill those gaps.

Measures of TIR engagement

	Items	Explanation
Standard 1: Institutional Commitment.	<ul style="list-style-type: none"> • 1C-1. Engaged Staff. 	A TIR counts as engaged staff.
Standard 2: Leadership and Collaboration	<ul style="list-style-type: none"> • 2A-3. Teacher in Residence (TIR). • 2A-4. <i>Teacher Advisory Group (TAG).</i> • 2B-5. Integration of TIR. 	Establishing a TAG can be an important role of a TIR.

Main benefits of TIR

Ones that are less likely to be an influence are in italics.

	Items	Explanation
Standard 2: Leadership and Collaboration	<ul style="list-style-type: none"> • 2B-4. Personal motivation. • 2B-6. Connection to K-12 teachers. • 2C-4. <i>Collaboration with PTE mentor.</i> • 2C-5. <i>University supervisor collaboration.</i> 	<p>A TIR is likely to have strong personal motivation to improve PTE, and will provide a connection to K12 teachers.</p> <p>They often also serve as the PTE mentor and university supervisor.</p>
Standard 3: Recruitment	<ul style="list-style-type: none"> • 3A-3. <i>Physics teaching advisor.</i> • 3B-1. Physics teaching ambassador. • 3B-2. <i>Accurate information.</i> • 3B-3. Program promotion. 	The TIR serves as a strong ambassador for the profession and promotes the program, though they may or may not correct misperceptions about the profession. If they are a member of the physics department, they may also serve as a teaching advisor.
Standard 4: Knowledge and Skills for Teaching Physics	<ul style="list-style-type: none"> • 4C-1. Number of cooperating teachers. • 4B-4. <i>Physics microteaching</i> • 4C-2. <i>Quality of cooperating teachers.</i> • 4C-4. <i>Quality of university supervisor.</i> 	The TIR often provides a connection to local teachers, and may be able to be more selective about which ones are high quality, potentially affecting the number and quality of teachers for field placement. They often act as the university supervisor, and if they teach the pedagogy course they may be able to provide microteaching experience.
Standard 5: Mentoring, Community, and	<ul style="list-style-type: none"> • 5B-2. PTE mentor. • 5B-4. <i>Community of teacher candidates.</i> • 5C-1. <i>Alumni community.</i> 	The TIR often serves as the PTE mentor (though not usually the formal advisor). They can play a role in building community given their time

Professional Support	<ul style="list-style-type: none"> • <i>5C-3. PTE mentor for beginning teachers.</i> • <i>5C-4. Professional development for in-service teachers.</i> 	and engagement with teacher candidates, and will often serve as a mentor for new teachers or support an alumni community. In some cases, they will organize professional development opportunities from the physics department (such as Modeling instruction workshops or QuarkNet).
-----------------------------	---	--

Main benefits of a Teacher Advisory Group (TAG), which TIRs often facilitate

Ones that are less likely to be an influence are in italics.

	Items	Explanation
Standard 2: Leadership and Collaboration	<ul style="list-style-type: none"> • 2B-6. Connection to K-12 teachers. 	A TAG provides strong connections with local teachers.
Standard 3: Recruitment	<ul style="list-style-type: none"> • <i>3C-5. Exposure to K12 teaching environments.</i> 	Having a TAG may enable early teaching experiences to occur within those teachers' K12 classes.
Standard 4: Knowledge and Skills for Teaching Physics	<ul style="list-style-type: none"> • 4C-1. Number of cooperating teachers. • <i>4C-2. Quality of cooperating teachers.</i> • <i>4C-3. Field experiences.</i> 	The TAG typically provides better access to cooperating teachers for field experiences and student teaching, who are likely to be of high quality. While this may not affect the licensure program itself, it may affect the quality of available field experiences.
Standard 5: Mentoring, Community, and Professional Support	<ul style="list-style-type: none"> • 5B-5. Community with in-service teachers. • 5C-1. Alumni community. • 5C-2. Local physics teachers group. • <i>5C-4. Professional development for in-service teachers.</i> 	The TAG provides a set of teachers to provide community with pre-service and in-service teachers, which may be an alumni community as well. The TAG members may also lead professional development experiences through the PTE program.

C. For Teachers-in-Residence

1. Introduction and Purpose

This section is written with the intent of providing historical context and background for the TIR position. It is also intended to provide some guidance, direction, and tips for getting started as a TIR and as a refresher for the veteran TIRs.

2. A Brief History of the TIR

Since PhysTEC started in 2002, there have been 85 different TIRs at 33 different institutions. Some TIRs have worked one year and then returned to the classroom, some have stayed in the position for two or more years, some have stayed on at their institution in different roles, and some have taken the TIR position after retiring from teaching HS. Additionally, the time commitment of the TIRs has been from very part-time (5-10 hrs/week) to more than full-time.

There are many factors at each institution that determine and shape the role that the TIR assumes. Just as was the case for the previous 85, the role of each new TIR will be unique and constantly evolving.

However, there are many job responsibilities that all TIRs share and there are many lessons that have been learned from former TIRs. The most common job responsibilities are listed in #7 of the previous section.

The time commitment for each of those responsibilities varies considerably for the reasons noted in that section. A detailed accounting of the time commitments from previous TIRs (both full-time and part-time) has shown that TIRs spend:

- ~50% of their time in instruction and instruction-related activities, including tutoring, working with LAs, and course revision.
- 15 – 20% of their time engaged in mentoring and induction related activities.
- 5 – 8% of their time directly involved in recruiting and outreach activities.
- The remainder of the time was distributed throughout the remaining activities that are listed as well as several others that are not.
- It is worth mentioning here that the time spent in the “recruiting” category is difficult to quantify. Although there may be specific, defined, formal recruiting events and activities scheduled, the TIR is often engaged in informal recruiting activities as well. This happens in conversations with LAs, undergraduate physics students, and simply by being a face of physics teaching at their institution. Many informal conversations with students often turn to discussions of teaching physics.

3. Additional TIR Suggestions

TIRs should be prepared to recruit early and often! The amount of time spent in the “recruiting” category is difficult to quantify. Although there may be specific, defined, formal recruiting events and activities scheduled by each site, the TIR is often engaged in informal recruiting activities as well. Once the TIR is established as the face of physics teaching at the site, the TIR will often be engaged in physics teaching-related conversations with interested undergraduates. There are several strategies and tools that the TIR can have at their disposal for both formal and informal recruiting.

- *Physics teaching brochure*: It is helpful to have something concise and informative to be able to give interested students. Be sure to include the contact name/number of the TIR.

- *Recruiting posters:* Like the brochures, these are concise and informative. These can be placed in visible and strategic locations and list the contact name/number of the TIR.
- *Get the Facts Out:* An excellent collection of research-based materials related to and addressing the myths surrounding STEM teaching. See: <https://getthefactsout.org/>
- *Free Food:* Include donuts or pizza or ??? as part of a recruiting event. The number of attendees will increase!

Additionally, some TIRs have mentored their replacement teacher at their high school and some have some have mentored their replacement TIR. Both of these types of arrangements are unique but have been helpful to those involved.